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APRIL 1959 VOLUME ONE

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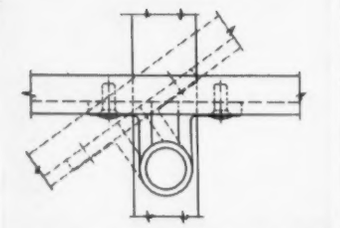

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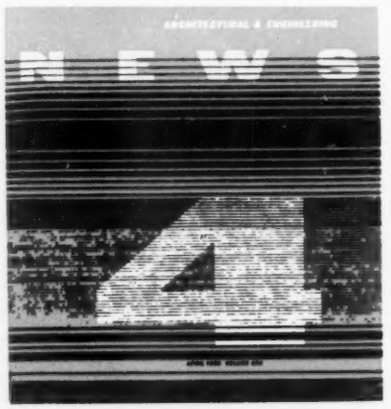

This month's cover by Bob Gill abstractly states, through a variegated series of lines, the infinite architectural and structural potentialities in the contemporary use of concrete. Strength, plasticity, durability, lightness and versatility of application are among its wide range of design qualities.

4

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Reader service cards

Facing pages 12 and 36

gazette

Robert W. Cutler, AIA, past president of NY Chapter of AIA and partner in architectural firm of Skidmore, Owings and Merrill, appointed member of the Art Commission of City of New York by Mayor Wagner.

Joseph Esherick, AIA, of the Northern California Chapter of AIA named to San Francisco Art Commission.

Former AIA President Glenn Stanton of Oregon Chapter reappointed to four-year term on Portland City Planning Commission.

Professor James Grote Van Derpool named Acting Dean of Columbia University's School of Architecture, succeeding Leopold Arnaud, who retires after 24 years as Dean. Professor Van Derpool is national chairman of the U.S. Department of the Interior's Historic American Building Survey.

Michael Goodman, AIA Chairman of the Northern California AIA Chapter's Area Planning Committee, has been elected president of the Bay Area Federation of Planning Commissioners which represents 78 cities in nine counties.

Alexander Sweney, AIA's Washington-Metropolitan Chapter, appointed to the National Capitol Regional Planning Council and also to serve as chairman of the Loudon County Planning Commission.

Sherwood, Mills and Smith, Architects of Stamford, Connecticut, named member of the Architects Advisory Panel of the Union of American Hebrew Congregations, the parent body of more than 560 Reform Congregations in the United States.

Office announcements

Ted Arthur Homa, AIA, formerly with Pereira and Luckman, Architects, has opened his new office at 505 Fifth Ave., New York 1, N.Y.

Kocher, Bradford and Nishimura, Consulting Engineers, to new address at 1206 South Maple Ave., Los Angeles 15, Calif.

Alvin L. Voogd, Architect, to new address at 40 Somerset St., Plainfield, N.J.

B. W. Franklin, Architect, announces address change to 210 Perquimans Drive, Raleigh, N.C.

Stone and Birkle, Mechanical Engineers, announce their office at 319 Midland Savings Building, Denver 3, Colo.

S. F. Muchemore Associates, Inc., Consulting Engineers, to new office at 6 West Putnam Ave., Greenwich, Conn.

Wilkins and Ellison, AIA, Architects, to new address at 507 Terminal Sales Building, First Ave. and Virginia St., Seattle 1, Wash.

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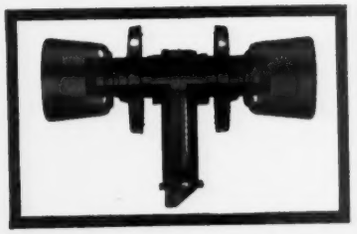

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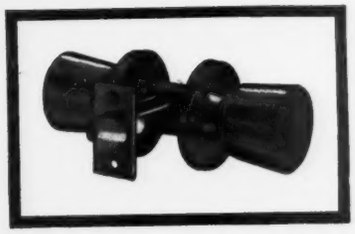

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forecast

THE CHALLENGE TO STRUCTURAL ANALYSTS

*by Raymond W. Sauer**

Editor's preface: This paper was presented at the recently held Fourth National Construction Industry Conference, the theme of which was, "Creative Trends in Urban Building." The original text, which is available, has been edited to present the highlights of Mr. Sauer's critical and principal formulations. The complete text, containing comprehensive documentation (eliminated here for the sake of brevity), supports the detailed areas of his discussion by use of comparative charts, stress diagrams and other pertinent research materials and data.

Nature of the challenge

The changing structures of today and the new types of structures present an unusual challenge to structural analysts. Although structural analysis has made some progress in the last fifty years, the rate of progress is extremely low and must be increased. I would like to offer my impression of what should, and must be done to foster this change by the construction industry, in general, and by educators, practicing engineers, and architects, in particular.

Hardly a century ago, structural analysis had its true beginnings. Prior to that time, the principal structural elements and forms were massive columns, beams, arches and domes. The Acropolis at Athens, the ancient Roman Forum, and the aqueducts, and the cathedrals of the Middle Ages are good examples of this. The architects of those eras were able to build magnificent structures using these massive elements, but from our point of view, the structures were inefficient. I would like to quote two passages from the 1907 edition of *Theory and Practice of Modern Framed Structures* by Johnson, Bryan and Turneaure (at one time one of the most widely used texts on structures in the U.S.):

"Mr. Squire Whipple, C. E., seems to have the distinguished honor of being the first man who ever correctly and adequately analyzed the stresses in a truss, that is, in a framework by which loads are carried horizontally from joint to joint by means of chord and web systems and finally delivered vertically upon the abutments. This is the true function of a truss; and although Palladio, Long, Howe, and Pratt had already designed and built such structures, they had never known what stresses the members were subjected to, and did as all engineers and builders did in those days—dimensioned the members in accordance with such experience and judgment as they could bring to bear upon the problem. For instance, the vertical tie-rods in the Howe truss were at first made of the same size from end to end."

Concerning beams they say:

"Navier finally, in 1823, put the matter on a solid mathematical basis, although he also at first went entirely astray. Navier later developed fully the theory of the deflection of beams as we now use it.

"In 1857 Saint-Venant, a student of Navier, gave a complete analysis of both the elastic and the ultimate strength of a beam. These equations give theoretical results which agree with the actual tests when the empirical constants are properly evaluated. This great engineer, physicist, and teacher has done more than anyone to bring theory and practice into harmony and to put both on a thoroughly scientific basis, so far as the strength and elasticity of engineering materials are concerned.

"In spite of these various true expositions of this subject, the source of strength in a beam continues *still to be very imperfectly understood by many engineers, and even by current writers on applied mechanics, and gross errors in this direction are still common."*

During the last few decades analysis in the design office has been routinized. We have learned [from a study of] strength of materials that all stresses can be broken down into shear stresses and normal stresses. In addition, these stresses are determined by simple formulae. For the beams the shear stress is given by $v = \frac{VQ}{It}$ and the maximum normal stress by $s = \frac{Mc}{I}$. For single force members, the stress is given by $s = P/A$. Almost without exception, we apply these expressions to structural components. If a structural innovation should occur (witness the flat slab), it does not find acceptance unless and until a *simplified* design procedure appears.

New analytical tools

New structural forms are being introduced which, by their very nature, will force the analyst into a much more elaborate analysis than he has been accustomed to. The shells of today—cylinders, spheres, hyperbolic paraboloids, conoids, etc., are good examples of this structural type.

The tools are available today to solve these problems in the form of electronic high speed computers, so that the solution of complex problems [of more elaborate design analysis] is now within the reach of every engineer.

Inadequate research

We do not have to go to the extreme of looking at domes [or other shells] to find an example of a structure which is difficult to analyze. For example, we still do not understand completely the theory of beams. A case in point is the minimum weight beam. If bending alone is considered, this design according to present theory leads to a beam of infinite depth. Since in this case the moment of inertia is infinite, both deflection and stress are zero for a weight approaching zero. Outside of being impossible to build, we know this solution is ridiculous because a fundamental assumption of beam bending is violated, that is, to be a beam, a member must be long compared to its depth. Actually, if no other restriction is put on depth, we find that it is limited by buckling considerations of the beam elements. Buckling, too, is not completely understood in, say, the flanges of beams of uniform section. In beams with tapered sections, which we would expect to find in minimum weight designs, nothing is known about the solution of buckling problems.

How could we have gone this far and not truly addressed ourselves to the problems of minimum weight design? Or indeed to the many other problems in design which remain unsolved or avoided. That we are doing little may be inferred from the following comparison: In the official Journals of some of the professional societies we find that: *24.3 papers presented yearly for 1,000 members of IRE; 8.4 papers presented yearly for 1,000 members of ASME; but only 6.1 for 1,000 members of the Structural and Engineering Mechanics Divisions of the ASCE.*

Assuming that the papers in each group are of comparable quality, this means that the analysis field which serves as the input to the largest industry in the United States is doing only one-quarter of that work (*"percentagewise" of the people involved*) as that being done to advance the electronics industry; one-quarter of that to advance the chemical field; and two-thirds of that being done to advance the electrical industry.

Role of materials

If we turn now from form to the field of materials, we see much the same picture. Modern materials of construction are hardly modern. Stone, brick, timber, tamped earth and some natural cements were known in ancient times. Cast iron and wrought iron have been used for centuries. Steel and concrete, as we know them, are fairly recent, having entered the construction field within the past century. However, for the greatest part of the time in which stress analysis has been in vogue, all of the common structural materials have been known and used—timber, brick, reinforced concrete and steel.

Other fields such as aircraft and missiles have prompted, even necessitated, the development of new materials; this is not nearly as true in the construction field. Many of these materials exhibit properties of strength and stiffness which would suit them for structures. Among these materials we find plastics, metals, ceramics and cermets, and combinations of these such as reinforced plastic or plastic impregnated wood.

Re-evaluate concepts

In analysis or in design we are concerned with material properties such as ultimate stress and Poisson's ratio which in general can be defined. Yield stress and Young's modulus, can only be defined, with a fairly large stretch of the imagination, for such materials as timber, concrete, cast iron and like. Ductility is usually not defined in any proper manner, yet it is paid lip service and is used as the "scapegoat" for the inadequacies of the analyst. Our students are still taught that if a moment connection is supplied at the end of the beam, and if for some reason (like stress concentrations due to rivet holes) the connection yields slightly, there will be a redistribution of stresses, and life will remain lovely. Now isn't this a fine state of affairs? First we insist that design stresses be kept below the elastic limit to prevent permanent deformations, and then we blithely permit them in cases where our analyses are very crude. This is not the refined analysis of which we are capable. It merely allows us to make *better guesses* than the great builders of the Renaissance.

As new materials become available, and are used in structures, we will have to re-evaluate our concepts of yield, elastic modulus, and ductility since in many of these materials these quantities are ill defined or non-existent. Our structures will necessarily be adapted to utilize the new materials since it is inconceivable that in every instance the materials would be used efficiently if they were adapted to conventional forms.

Some concern must also be expressed when one looks at the present [building code] specification of loadings. In many cases, the conditions under which the loads were developed are antiquated and bear little resemblance to the modern conditions they are supposed to represent. How realistic, for example, is a code that requires one to design a hotel room on the basis of 40 psf or which still calls for wind loads acting as inward pressure on both sides of gabled roofs, regardless of pitch. These loads are known to be in error, but it is felt they are safe and so they remain as specifications.

Specifications for corrosion—the addi-

*Supervisor, Structural Analysis, Armour Research Foundation of Illinois Institute of Technology

tion of some nominal thickness of material, or column loading—reduced loading because all floors above the column will probably not be fully loaded at the same time—are more the *product of judgment than of studies utilizing probability concepts.* Specifications of allowable combined loading, probability of maximum wind occurring with another maximum loading condition, and dynamic load factors impact factors that increase live loads by 50 per cent, are certainly open to serious question.

Curricula and computers

I have painted a somewhat bleak picture of the inertia and lack of progress which characterizes many sectors in Structural Analysis. However, this was my intent. One may argue that there are some hopeful signs which I have not mentioned and have emphasized the outmoded, rather than the good, which needs our major attention.

What can we do to foster corrections? Let me answer this by addressing first the educators. It is the educator's responsibility to the profession to supply well-rounded engineers. This means that the curriculum specified for a degree must be the best which we can arrange. Rather than train the embryonic engineers in analysis, too many of us have taken the attitude of "what was good enough for father is good enough for son." Many colleges would be hard-pressed to show that what they are currently teaching today, in the analysis of framed structures, differs radically from that 1907 edition of *JBT* which I quoted earlier. Why are drudge courses in [structural] design still considered a necessary part of undergraduate training? As long as codes govern design, this experience can be gained quickly by the young engineer out of college. Why are such courses as elasticity and plates and shells not considered proper subjects for the undergraduate? Why are computers and computer techniques still held in awe? A recent meeting of the ASCE on computers in structural applications illustrated not only their potential but their enormous usefulness.

Engineer's responsibility

And now to the practicing engineer. I'm referring to the so-called "average" engineer, which fits most of us. It is true that there are forward-looking individuals and groups who have done good jobs in advancing the state of the art in structural analysis. However engineering cannot be considered an eight-hour-a-day job. Continued study and keeping abreast of new developments are necessary "after five o'clock" tasks. Education is never complete and, even if we cannot take regular courses at a school, we must continue to read in our field, not only papers

(Continued on page 47)

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$315 million re-development plan for 136-acre, semi-slum Bunker Hill area of downtown Los Angeles. Plan provides inter-connecting plazas for pedestrian traffic by series of overpasses, moving stairs and moving sidewalks. Charles Luckman Associates of Los Angeles are supervising architectural firm with William L. Pereira as Associate Architect.

The Zeckendorf (Top Photo)
The Athens Hilton (Center Photo)
The Central City (Bottom Photo)

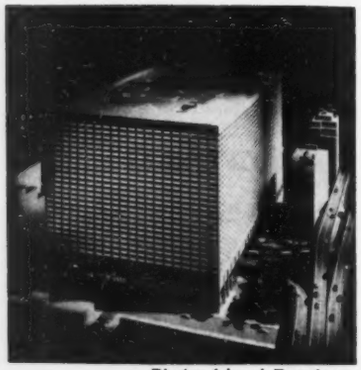

Photo: Lionel Freedman

2000-room luxury hotel

A new 2000-room luxury hotel for New York, the first to be built in Gotham in 28 years, is scheduled for completion in 1961. The $66 million, 48-story combination hotel-and-office structure will be erected on 51st St. adjacent to Rockefeller Center. Architects of the project, to be named the *Zeckendorf*, are Harrison & Abramovitz; Structural Engineers, Edwards & Hjorth; Mechanical Engineers, Jaros, Baum and Bolles; Contractors are the George A. Fuller Co. and the Webb and Knapp Construction Corp.

Hilton in Athens

Oriented with a view of the majestic Acropolis, the $7 million new Athens Hilton hotel project, scheduled for completion in 1961, will be situated in a redeveloped cultural center of this ancient city. The facility will provide 480 guest rooms, restaurants, supper clubs, a terraced garden, swimming pool and cabanas and an aquatic club. The air-conditioned structure will use pre-stressed concrete slabs and reinforced concrete framing. Finishes will be typical Greek building materials: marble, pre-cast stone and terra cotta. Architects are Vassiliades, Voyrekas and Staikos of Athens, Greece and Warner, Burns, Toan & Lunde of New York, Consulting Architects. Other professionals retained are: Z. Naxnikian, Structural Engineer, Athens; Paul Margaretides, Electrical Engineer, Athens; and Zumwalt & Vinther, Mechanical Engineers of Dallas, Tex.

Manhattan superblock

"The Central City," five million sq. ft. mid-Manhattan superblock providing air-conditioned offices, postal, showroom and manufacturing facilities, has been announced by William Zeckendorf, president of Webb and Knapp, Inc. Scheme calls for connection to proposed crosstown expressway to link structure directly with west-side tunnel accesses to Jersey shore. I. M. Pei, AIA is Architect with Kahn and Jacobs as Associate Architects; Structural Engineers: Andrews and Clark and Charles Mayer; Mechanical Engineers: Jaros, Baum and Bolles.

West Coast report

Plans for the $15 million *Marine Plaza*, the largest development undertaken by private investors in downtown Milwaukee, Wis., have been announced by Victor Gruen Associates, architectural and planning firm of Los Angeles.

Milwaukee Architect Robert Rasche is associated with the Gruen firm on the project which will encompass two downtown city blocks. The program calls for a 28-story office building, a 5-story bank building, multi-level parking and a landscaped plaza. A moving sidewalk for pedestrians will connect parking facilities to the office units. Project to be completed 1960.

Charles Luckman Associates of Los Angeles announced construction bids were received for a new academic building, the first unit of a total master plan to provide full facilities at the new Southern California School of Theology at Claremont, Calif. Associated with the project are Architects Criley and McDowell of Claremont . . . Construction has begun on the 134-bed, $1.7 million addition to the Grossman District Hospital of Las Mesa, Calif. William L. Pereira is Associate Architect with Charles Luckman Associates. Luckman and Pereira designed the original hospital as well as the addition.

AIA portfolio

The AIA's annual convention will key-note the theme of design, which, in a statement of AIA President, John Noble Richards, FAIA, is "the architect's unique contribution and monopoly and his first obligation to the public . . ." Philip Johnson will moderate a panel in which discussion of individual theories of design will be made by Edward D. Stone, William L. Pereira, Minoru Yamasaki, and Charles E. Pratt of Canada. Other seminars of interest will be presented.

This year's convention site is New Orleans. The AIA, in announcing the annual event, stated: "In light of the unique cultural and historical background of New Orleans, it has been decided that the 1959 AIA Convention will depart from the usual convention pattern. In contrast to previous annual meetings, the Institute is organizing only AIA professional and business meetings for all delegates and members. National Awards and College of

Fellows ceremonies will be part of this official program."

Architectural research was the subject of a recent two-day working session held in Ann Arbor, Mich., by a specially invited group of prominent architects, social and environmental scientists and engineers. The conference was sponsored by the AIA with a grant from the National Science Foundation.

At the session, AIA director of education and research, Walter A. Taylor stressed the need for architectural research by saying, "there is far too little as distinct from building research of which there is plenty." He further explained, "Architectural research is concerned with the social and life sciences and the reaction of humans to the man-made environment the architect creates. Building research is concerned with materials of construction and their assembly."

The Jury for the 1959 R. S. Reynolds Memorial Award for the most significant work of architecture was recently announced. Its distinguished members are John Noble Richards, Eero Saarinen, Robert E. Alexander, William W. Caudill, and Carlos Contreras of Mexico City. The Reynolds Award, consisting of a $25,000 honorary payment plus an emblem, is international in character and participation. It will be presented at the 1959 Annual Convention of the AIA.

National meetings of note

The annual general meeting of the *Consulting Engineers Council*, the CEC, has been set for April 28 through May 3 at the Biltmore Hotel in New York City. Over 200 delegates representing nearly 1,000 private consulting engineering firms will attend. The CEC is a national federation of professional engineers engaged exclusively in private practice. The guest of honor will be Julian S. Tritton, President of the International Federal of Consulting Engineers, an organization of which CEC is an affiliate.

Over 1500 engineers are to attend the national convention of the *American Society of Civil Engineers* to be held in Cleveland, Ohio, from May 4 to 8. Emphasis will be placed on the engineer's role in city planning.

The third annual national convention of the *Construction Specifications Institute*, (CSI), will be held at the Palmer House in Chicago from May

(*Continued on next page*)

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ae news

(Continued from page 7)

4 to May 6, inclusive. Technical meetings, seminars, workshops and panel discussions to meet the problems of specification in construction are to be presented.

Consideration of the more effective use of engineering skills and talents will highlight the topics to be discussed at the *Fourth Design Engineering Conference* sponsored by the *American Society of Mechanical Engineers* in Philadelphia from May 25 through May 28. The conference will be held concurrently with the well known Design Engineering Show.

Cleveland will also be the site for the two day *Building Research Institute* conference on illumination levels for buildings to be held May 20 and 21. One of the featured speakers is the noted architect, Henry Wright who will describe developments in the architectural uses of lighting.

Professional education

A distinguished committee of *The American Institute of Architects* headed by President John Noble Richards, FAIA, is studying the feasibility of opening a school of architecture at the University of Puerto Rico. At the request of Chancellor Jaime Benitez, a survey was conducted which found a critical shortage of architects on the island and remarkable progress in Puerto Rico's social, economic and physical planning procedures. The AIA unit's recommendation will be submitted to Chancellor Benitez in time for the opening of the the island's legislature in May.

Forty-nine finalists from 19 architectural schools of leading universities and colleges have been chosen to participate for the $5,000 Lloyd Warren Fellowship, the 46th Paris Prize in Architecture administered by the *National Institute for Architectural Education.* The qualifying preliminary competition was for "A Permanent Exposition for I.G.Y. Findings."

The creation of a new division of professional study of Materials Sciences and the creation of degree programs will be considered and discussed by the *American Society for Engineering Education* and the *American Society for Testing Materials* jointly at a symposium on "Education in Materials" to be held in Atlantic City, June 22 to 26, 1959.

NEW CITIES FOR OLD . . .

as the nation enters a spectacular decade of building activity, urban renewal programs are most effective where zoning regulations permit orderly and imaginative development. America's largest city, New York, poetically described as Bagdad-on-the-Subway . . . this, the nation's exploding thyroid gland—calmly examines its future growth through the medium of a dramatic new zoning proposal.

America is on the threshold of a booming decade in construction activity—for an estimated $700 billion expenditure by 1970. Urban renewal programs for the redevelopment and rebuilding of cities, coast-to-coast, are underway with the vigor and enthusiasm given to the "City Beautiful" movement at the turn of the century. Another index of the impetus to rehabilitation is provided in currently proposed federal legislation (HR 2357) which would authorize an increase in the present $1,250 million capital grant for urban renewal by $500 million more for each of the fiscal years: 1959, 1960 and 1961. The appropriations for planning grants would increase from the present $10 million to $20 million.

Recently, plans were announced for the nation's largest and perhaps most spectacular urban redevelopment. At a cost of $315 million, Los Angeles' blighted Bunker Hill area would develop the present substandard 136-acre area into: a 24-acre residential plaza containing 3,100 apartment units; a 16-acre plaza for business structures, a six-acre hotel site; a four-acre shopping and office complex; and a 14-acre motel section.

Supervising architects for this elaborate project is the firm, Charles Luckman Associates with William L. Pereira as associate architect. The project encompasses a wide and carefully integrated system of vehicular and pedestrian movement in and around the project.

Many other American communities are undertaking similar programs—equal in ambition, if not in scale.

Against the background of this dynamic planning and activity stand the conditions of existing building codes—many of them chaotic—and zoning regulations—in some cities nonexistent; in

(*Continued on next page*)

Lever house photo (left), J. Alex Langley

Lower Manhattan (right), courtesy of Port of New York Authority

NEW CITIES FOR OLD

New York City's miles of waterfront border vast industrial complexes (photo left: Port of N.Y. Authority). Yet, within its boundaries, New York has marinas, yacht basins, and other recreational facilities (right) whose development would be encouraged under new zoning proposal.

Blocking of traffic and subsequent congestion created by industrial loading zones (top photo) would be prevented by requirement of on-site facilities (bottom photo) within carefully-zoned industrial facilities.

others—expeditious and quixotic in character.

The ultimate success of much of the current redevelopment of our urban centers will depend on good planning for a diversity of building types and facilities in land use, optimum population densities per acre-use, and the conscientious creation of an effective environment for living, work and recreation.

For decades, the nation's cities have had municipal building codes providing for the safety and occupancy uses of buildings. However, *zoning* regulations providing for district use and density controls are, historically speaking, relatively new.

It was not until 1916, that a zoning resolution was adopted by New York City —the first American city to do so. Since that time many cities have adopted zoning resolutions. The City of New York, which pioneered this area of city planning, has found that although its zoning ordinance represented great progress 40 years ago, it is now living in "zoning's past."

According to James Felt, Chairman of the City Planning Commission of New York, "it is an anachronism in the day of the family car, the supermarket and shopping center, large-scale housing developments, industrial parks and airports for jet planes."

New York City's planners have found that outmoded zoning for the nation's largest metropolis is costly. By clinging to an obsolete zoning structure, burdened by the weight of 2,500 resolution and map amendments for an implausible 1,000 possible combinations of use, height and area districts, a severe obstacle impedance to growth is occurring. It has resulted in overbuilding and congestion in some parts of the city, while others are vacant and blighted.

The builder and the architect are penalized through controls leading to stereotyped designs that rigidly restrict the outer form but ineffectively deal with the bulk and density they are intended to control.

Conformity of housing types dictated by the economics of the present regulations have narrowed the choice for the home-seeker and discouragd the variety desirable and necessary for so complex and varied a population as New York's. Ineffective zoning has created sheer waste of all-too scarce sites needed for employment-producing and tax-paying industry. The jamming and blocking of streets needed for the movement of cars has occurred because no logical provisions can be made for their parking.

In these and in many other ways the existing zoning structure in New York has imposed a total pattern of land development bearing no meaningful relationship to the metropolis that exists or that will be. The present ordinance would permit a "nightmare" city of 55 million residents and 250 million workers. Obviously, the crowded New York of today in which some eight million people live and four million work is not going to be transformed into such an inconceivable size. A pattern which would permit this transformation is not capable of rationally controlling land development.

Two years ago, in recognition of this desperate need for a realistic rezoning of the vast metropolis, the City Planning Commission selected the architectural firm of Voorhees Walker Smith Smith and Haines to carry out this project. Over its 75-year history, this firm has established a national and international reputation in the planning and architectural fields and has executed major assignments for governmental, industrial, business and institutional clients in this and other countries.

With great thoroughness, four sides of every block were covered for a total of almost 30,000 miles, by a field staff using autos, helicopters and motorboats.

According to Perry Coke Smith, FAIA, senior VWSS&H partner in charge of the study, the proposed zoning, "represents a natural evolution and improvement of modern zoning concepts and techniques fitted to the special needs and conditions of New York City."

The Technical Director of the project, with the architectural consultants was, Jack C. Smith, formerly Director of Planning of the Chicago Plan Commission.

In creating the new zoning proposal, the study directed itself to a realistic concept of the future city. The proposed zoning could accommodate homes for some 11 millions persons—2.6 million more than the city's anticipated population in 1975. Thus, it would provide ample "elbow-room" for future residential, commercial and industrial growth. It seeks to avoid the overbuilding and congestion in some parts of the city and the waste and blight in others that resulted from the fantastically inflated and unrealistic population ceiling of 55 million residents and 250 million workers permitted by the present archaic zoning.

Single map system

A *single map system* is recommended that is simpler to understand, easier to use, and designed to provide for more effective controls than the present cumbersome *three-map system*. A total of 47 different types of integrated districts are mapped in the proposed zoning compared to 286 combinations of use, height and area districts currently mapped.

Use group charts

Positive use control is based on the compatible group of all known land uses in 18 "use groups." A simple table indicates which use groups are permitted in any given district. This chart permits easy identification of the types of uses permitted in each district. It shows which "groups" are compatible with each other as well as with uses in adjacent districts.

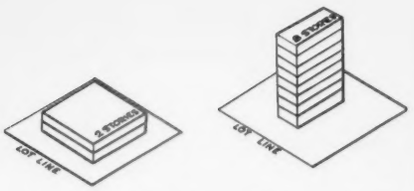
Bulk, use and density controls

Directed and related controls on use, bulk and density of development, and parking are provided in every district. Each of the major controls operates individually and in close relation to each other, like the works of a clock to achieve a better, more comfortable, and more efficient city for homes, business and industry.

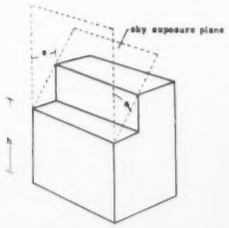
Bulk controls for architect

An effective and ingenious system of bulk controls was devised which allows maximum design freedom to the architect and construction economy to the builder because controls are directed at *substance, not form*. Predictable population densities would permit more rational planning of public services and facilities. The density controls would apply to the conversion of existing housing as well as new construction and should play an important part in protecting older neighborhoods from one of the major causes of blight.

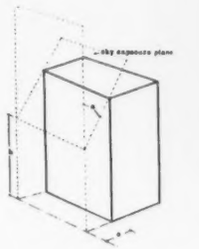
Some proposed methods of control



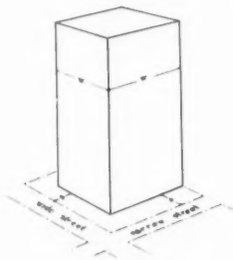
FLOOR AREA RATIO: this device would limit bulk while permitting greater design freedom. Reasonable FAR limits prevent overloading of land with buildings of excessive bulk.
Formula: floor space x 100 / lot area



SKY EXPOSURE PLANE: relatively simple new device developed by VWSS&H to insure adequate light and air to streets. Provision would permit greater flexibility to developers. "h": height of plane above street. "a": angle of slope. "s": initial setback distance.

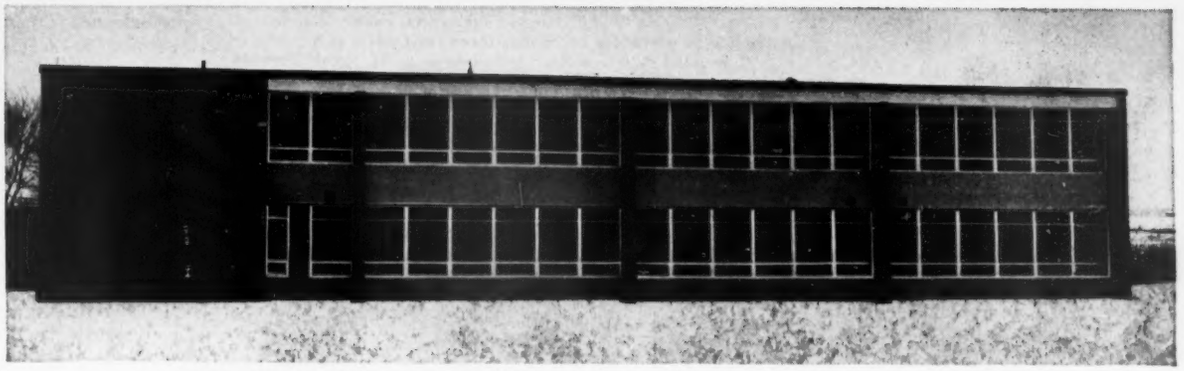


ALTERNATE SKY EXPOSURE PLANE: second new device permits street walls of buildings to rise to greater heights provided buildings set back a specified distance at street level. "h": height of plane above street. "s": optional front area depth. "a": angle of plane slope.



TOWER REGULATIONS: this device in combination with floor area ratio permits more economic building type while placing reasonable but definite limit on permitted floor area. "s": required setback from streets. "w": aggregate street wall widths.

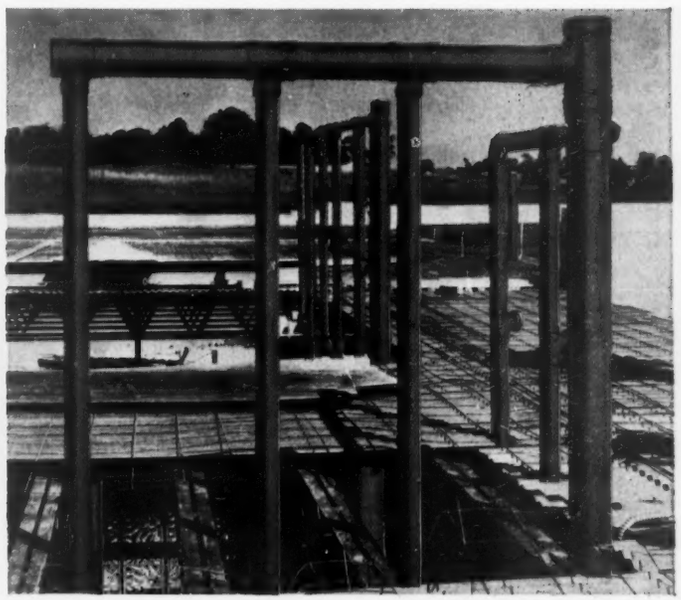
(Continued on next page)



GOWER SCHOOL ADDITION, Hinsdale, Illinois. *Architect:* Wight & Schlaebitz, Downers Grove, Illinois. *Plumbing and heating contractor:* Jerry & Phil's Plumbing & Heating, Inc., Brookfield, Illinois.

SUPERIOR **ALL-COPPER PLUMBING** IN THIS SCHOOL AT LOWER COST TO TAXPAYERS

COPPER SANITARY DRAINAGE LINES roughed-in among structural members at Gower School. This space-saving installation would have been impracticable with heavy, bulky pipe requiring threaded or caulked joints.



COPPER SANITARY DRAINAGE LINES for second floor lavatories at the Gower School. Light weight of copper tube and ease of making solder joints save many dollars on multiple installations like this. Compact assemblies eliminate wide plumbing walls, give greater usable floor area.

Phil Bergeron and Jerry Wehrmeister, plumbing contractors near Chicago, have found that the installation economies with copper tube and solder-joint fittings enable them to offer all-copper plumbing—water supply *and* sanitary drainage—at a cost lower than competitive bids based on installing ferrous piping. Recent jobs awarded to them as low bidder include the Gower School, the LaGrange Township Junior High School, a church, health center, two restaurants and a store. Anaconda was used for all these jobs. Phil Bergeron says, "We specify Anaconda Copper Tube and Fittings because their consistent fine quality and close tolerances makes our work easier and keeps the job costs within our estimates."

Contractors, builders, and architects the country over are finding that they can provide long-lasting, low-maintenance all-copper plumbing at a cost competitive with ferrous piping. For information on Anaconda Copper Tube and Fittings, write for a copy of Publication C-33. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

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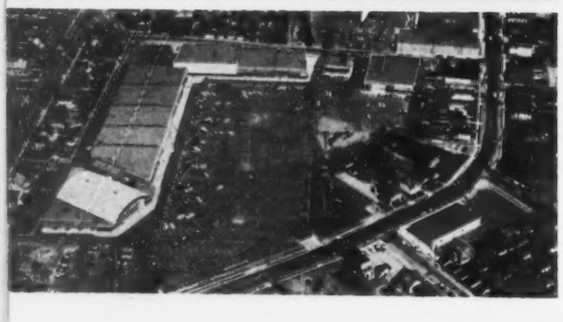
Present residential densities (left top) would be prevented by builder-incentive system of bonuses to provide variety of high and low-rise units, openly planned residential areas (right top and bottom) for more pleasant urban pattern.

NEW CITIES FOR OLD

Commercial parking—the nightmare of all shoppers and municipalities (above) would be provided for on-site within carefully zoned projects (below).



Bonus system

Superior open-space standards are proposed for residential districts. In addition a system of *bonuses* would offer the builder an incentive to provide more than the required amount of open space in all districts—commercial and manufacturing as well as residential.

Parking

Substantially higher off street parking standards are set in recognition of the explosive and continuing growth of auto use in New York, which has shown an increase of one-half million car registrations just since 1947. Unlike the present zoning requirements which apply only to new residential building, offstreet parking in the proposed zoning applies to all the new commercial and industrial building except in the congested areas of downtown Manhattan and Brooklyn.

Industrial performances

Specific provisions are made for industry which recognize its present-day requirements for efficient operation. Homes are excluded from all manufacturing districts, thus protecting New York's dwindling supply of industrial sites and affording increased safe-guards for home-owners.

Three types of manufacturing districts are established, distinguished from each other by the degree of nuisance such as smoke, noise, odor and the like that characterize them. In addition to a positive listing of *permitted categories* of plants for each type of district, use is made of a comparatively new zoning concept, the *performance standard of nuisance potential* now in successful operation in a number of cities.

Scientific measurement

These performance standards are established by scientific tests, and industrial plants are graded accordingly in determining their eligibility to locate in a particular district. Performance standards assure more positive protection to neighboring areas and at the same time give industry (willing to meet high standards) much greater flexibility of location.

The performance standards were developed with the aid of Dr. Walter C. McCrone, consultant to the Atomic Energy Commission and former senior scientist of the Armour Research Foundation of the Illinois Institute of Technology. The standards cover *noise, vibration, smoke, odors, toxic or noxious matter, radation hazards, fire and explosive hazards, humidity and heat or glare.*

Open space ratio

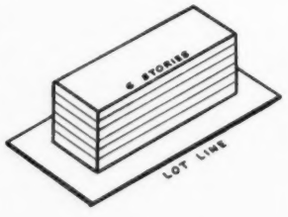
The new zoning proposal recognizes the growing importance of large-scale residential projects and provides a simple formula for the *proper spacing* of buildings, arrangmeent of open space, and the incorporation of the convenience shopping facilities which such projects require —without burdening them with the detailed administrative control which presently is in effect. Another major feature of this provision gives the city reasonable time to acquire sites that may be necessary for public facilities such as schools in connection with such projects.

The open space ratio is designed to insure adequate standards of open space in residential developments by a system of computation in which the amount of open space required is in relation to the total floor area of a building.

Except for the detached single-family home districts, all other residence districts will be controlled as general residence districts, ranging from low-density districts in the outer portions of the city to the high-density districts mapped in a few central, high-value areas. General residence districts would encourage a variety of housing types to create a more interesting urban pattern for the varied needs of a diverse population.

Significance of proposal

The new zoning proposals for New York City will not work a miracle overnight. However, they are a giant-step forward in view of the spectacular growth that all major cities of the nation will face. The experiences of the country's largest metropolis should prove to be a rich source of information for architects, city planners and the general public.



OPEN SPACE RATIO
Example:
Lot area = 20,000 sf
Each floor = 8,000 sf
Floor area = 48,000 sf
(6 x 8,000)
Open space = 12,000 sf
(20,000-8,000)
Formula:

$$\frac{\text{open space} \times 100}{\text{floor area}}$$

Utilization:

$$\frac{12{,}000 \times 100}{48{,}000} = 25$$

communications

School building costs

Editor:

Our national AIA committee on School Buildings and Educational Facilities was very pleased to see your excellent treatment of the California and New York material on school building costs.

One of the few comments on the New York study concerned the mistake in basic philosophy which would permit them to write:

"single-story vs. multi-story"
and
"campus vs. compact plan"

It should be pointed out that these are not necessarily alternatives in the sense of versus. The facts of specific site, educational program and economics govern the architect's proper selection of these design solutions. As usual, generalizations are hazardous and much lay confusion exists about these design alternatives. It has not been found true that any one is always cheaper—if that must be the criterion. We like Vincent Kling's left-hander:

"Low-cost has become a measure of the quality of a school building. . ."

There is a rather devastating opinion too, voiced in England, concerning the "space module concept" that ". . . there is less here than meets the eye. . ."

Finally it is quite important that no one try to total up possible percentage savings. These are not cumulative but involve overlaps and mutual exclusions.

All hail to Jules Feiffer! More, please.

Eric Pawley, AIA
Research Secretary
Staff Executive Committee
on School Buildings and
Educational Facilities of AIA
Washington, D. C.

Editor:

I would like to express my appreciation for the services your magazine offers us architects. May I wish you a long and prosperous life.

I particularly want to commend the article in the (January-February) issue entitled "School Dollars." Your points are so succinctly stated that I would like to be able to send copies to several people; not all of them potential clients. The questions you answer come up so often, and are so hard to answer, at a committee meeting, say, that I have often been tempted to write out a list similar to this and hand it around to allow further study.

Instead, too often, we find ourselves involved in long, circular discussions, full of jargon and hot air covering or not covering only one or two of the points you have made. Many offices base a whole sales and design philosophy on

(*Continued on next page*)

editorial

TO THE LADIES: The other day we received a polite but firm reminder that we had created one enormous oversight in presenting our survey of the architectural and engineering professional organizations ("Survey," November-December, 1958). It had been our smug impression that we had cleared up all possible omissions—but to our chagrin, we had blundered—and our mistake must be laid at the feet of those typical feelings of masculine superiority, or more accurately, according to the consensus of a few feminine experts of our acquaintance—male conceit.

So, as we rush to patch this crack of the ego, we hasten to point out the existence of three prominent *women's* organizations:

1. Association of Women in Architecture
2. Society of Women Engineers
3. Women in Construction

A statistical approximation reveals that out of every 100 architects in this country—1.5 is a woman. This fact may prove to be slightly disturbing because it implies that we must always gather at least 200 architects in order to get a round number of three whole women architects. Or, maybe that point 5 (.5) left over from the unit one, stands for woman's traditionally honored intuition. But let's cast the statistics aside and get down to the serious business at hand.

A recent survey of women in architecture indicates that there are 308 women registered architects in the United States, including Alaska and Hawaii. Of these: 16 per cent have their own offices; 10 per cent are partners with architect-husbands; 26 per cent are members of AWA; and 31 per cent are members of AIA.

Perhaps one reason why there are so few women architects is that it has only been in recent years that women have been admitted to professional study in this field.

The Massachusetts Institute of Technology pioneered the admission of women to technical fields of study. It is to MIT's everlasting credit that women have been admitted since it first opened its doors. There, more women have been graduated (at least in years prior to World War II) in architecture than any other field of technical study.

Yet, the art and science of architecture still remains a proud male preserve as a *gentleman's* calling, when contrasted to the influx of the *gentlelady* to the fields of medicine, professional education, and the social and precise arts and sciences.

A registered practising woman architect is still considered by some, as an object of curiosity. To compound this attitude, some educators believe that a woman architect, in achieving a professional level, may marry and still practice independently and take as few or as many commissions as she wishes. It is also claimed that being a woman, she can make a special contribution to the field of home and apartment house design.

Needless to say, and rightfully so, women who are registered architects challenge this rather limited view. They assert that part-time work or occasional work is possible in architectural drafting, but the successful practice of architecture requires full-time devotion for success. They quickly point out that they are qualified to design all types of structures (as their male colleagues), and that no area of architecture is one's exclusive right by dint of sex. What "specialization" occurs is not necessarily their own choosing, but the result of a continuing reinforcement of preconceived notions of the role of women, architects or not, which may arbitrarily affect or limit the range of their professional practice.

The organized voice of professional women in architecture and the related arts is *The Association of Women in Architecture*, founded in 1922 at Washington University in St. Louis. Its beginning membership consisted of the modest number of ten women students in the School of Architecture. Since that time, in its 37 years of existence, the AWA has grown to a membership of 1,062 women, of which about 300 remain active in architecture, landscape design, interior design or the allied arts. There are nine professional chapters and ten undergraduate chapters.

Among the many praiseworthy purposes of this organization are the promotion of good fellowship, enthusiasm and cooperation among women in architecture and any of its allied branches; the inauguration of a student advisory program to assist women students in the architectural; and the establishment of a placement service to help women graduates find employment in their own or other cities where there are active AWA professional members.

Currently, the AWA is attempting to establish a center or service for compiling statistics on women in the architectural profession.

AWA conventions are held biennially (even numbered years); the next meeting to take place in St. Louis in June, 1960.

The AWA issues a complete directory following each convention, and its publication, *Keystone*, appears twice a year. Currently serving as president is Mrs. Ralph A. Fournier, AIA, (neé Mary Jane Henske); the AWA National Historian is Betty Lou Custer, AIA.

Thank you ladies, for having reminded us of the valuable contribution your professional society and others are making to architecture and the allied arts and sciences. May we wish you every success and hope for the continuing growth of your professional groups in gaining the national recognition you so richly deserve. *JJC*

communications

(*Continued from page 13*)

only a few of these items. And of course many people, of both official and lay status, embrace one or two of these well known concepts as the universal panacea which will save their town from certain financial ruin. Well, I did not mean to run on like this, as though I was at a board meeting, but if there is a way for me to get copies of your article, I would very much appreciate your letting me know.

Sincerely,
W. F. Greene, Jr.
Architect
Windsor, Conn.

Editor's note: Reprints of "School Dollars" are available at a nominal cost.

Editor:

My congratulations on the quality of your new publication Architectural & Engineering News. It is one of the few items in today's mail that I actually read.

Your editorial, "A Floating Barge Foundation," and "School Dollars," were all excellent. Putting the meat of the School Building problem in three pages is a real accomplishment.

Very truly yours,
Frederic A. Long, AIA
Spokane, Wash.

Editor:

Your second issue is better than the first! Jules Feiffer's "School Dollars" and your editorial have more "meat" than the average professional architectural magazine...

Very truly yours,
William Lyman, AIA
Birmingham, Mich.

Editor's note: The Jules Feiffer credit referred to the cartoon which appeared throughout the article. "School Dollars" was a staff-written summary of the New York State and California reports.

Editor:

I notice by the March issue of *Oculus* that you have a number of reprints of "School Dollars." I believe that this would be a very welcomed and valuable addition to our "ammunition file". . . .

Sincerely yours,
Edwin B. Morris, Jr., AIA
Assistant to the Executive Director
The American Institute of Architects
Washington, D. C.

Editor:

I sincerely enjoyed the article entitled "School Dollars," which you had in the January-February issue of Architectural and Engineering News.

I believe it will be only through articles such as this that the "lay" public will understand the true value they are getting in today's school buildings. . . .

Sincerely,
A. Robert Broadfoot, AIA
Jacksonville, Fla.

COMMENT

Editor:

. . . Your periodical has met the crying need for a better understanding between the architectural and engineering professions. Your editorials are most enlightening. . .

Very truly yours,
David Podoloff
Architect
New Haven, Conn.

Editor:

I am a student of Architectural Engineering at the Pennsylvania State University. I have been introduced to your publication through our architectural library and I find it extremely interesting and informative.

I have observed that your magazine is distributed free of charge to registered architects and engineers. I would like to inquire if this also applies to students.

I would like to add your magazine to my personal library. Thank you very much.

Respectively yours,
William D. Sochko
Uniontown, Pa.

Editor's note: Thank you for your kind comments on A/E NEWS. We have had similar requests from students in professional schools. Much to our regret, we cannot comply with these at the present time by offering a special student rate for subscription other than the established one. Future plans project the inclusion of student readers. At present, free distribution is exclusively to registered professionals: architects and consulting engineers.

NOTICES

Editor:

The Graduate School of Design has available for award each year the *Arthur W. Wheelwright Fellowship in Architecture.*

This grant, which amounts to $5,830 this year, is awarded to an architectural graduate of the Graduate School of Design, who has had considerable practical experience in the profession and has shown promise of high achievement. Candidates are chosen on their entire records, including their work at the school as well as their professional experience.

The Graduate School of Design welcomes nominations from the profession at large and from potential candidates themselves for consideration for this award. Nominations should be addressed to the Committee on Scholarships and Awards, Graduate School of Design, Robinson Hall, Harvard University, Cambridge, Mass.

We will appreciate your assistance in helping us to publicize this award by including this announcement in your magazine.

Sincerely,
Huson Jackson
Professor of Architecture and Chairman of the Committee on Scholarships and Awards

Editor:

We take the liberty of sending you a communication with details concerning the international congress which will be held in the framework of CIB *(Le Conseil International du Batiment pour la Recherche, L'étude et la Documentation)* in Rotterdam, Netherlands, from September 21 to 25, 1959 and the subjects of which will be building research, studies and documentation.

Some of the subjects to be discussed are: "Design and calculation of structures; safety factors," with introductory lecture by Prof. E. Torroja, Director of the *Instituto Técnico de la Construcción y del Cemento,* Spain; "Research problems relating to the application of heavy concrete elements," with introductory lectures by Prof. G. Kutznetsow of the Academy of Building and Architecture of the U.S.S.R. and Dr. M. Jacobsson, Director of *Statens Nämnd för Byggnadsforskning,* Sweden; and "Fundamental Aspects of Transmission of Knowledge," By L. M. Giertz, Architect, Director of the Swedish Institute for Building Documentation. Among others, the following are members of the Organization Committee: J. van Ettinger, President of the CIB, Director of the Bouwcentrum, the Netherlands; Dr. F. M. Lea, former President of the CIB, Director of the British Building Research Station, Great Britain.

We hope that you will reserve for this communication a place in your columns and remain,

H. Th. van Schaik
The Secretariat of the CIB
c/o Bouwcentrum
P.O. Box 299, Rotterdam
The Netherlands

ACKNOWLEDGEMENT

Editor's note: We wish to thank the firms and individuals given below for their warm and gracious letters:

John Noble Richards, FAIA
President, The American Institute of Architects
Washington, D.C.

Edmund R. Purves, FAIA
Executive Director, The American Institute of Architects
Washington, D. C.

Harold D. Hauf
Dean, School of Architecture
Rensselaer Polytechnic Institute
Troy, N. Y.

Joseph Watterson
Editor, Journal of the AIA
Washington, D. C.

Warren E. Kaffka, Architect
Ridgefield, Conn.

J. H. Kuhn, Associate of the firm of
David Ludlow, AIA
Summit, N. J.

Leslie A. Black, Architect of the firm of
Erwin Carl Schmidt, AIA
St. Louis, Mo.

George S. Campbell
Campbell & Jones
Consulting Engineers
Chattanooga, Tenn.

David Marner, AIA
Asbury Park, N. J.

Willard W. Warzyn, PE
Madison, Wis.

William W. Esbach, AIA
Esbach, Pullinger, Stevens & Bruder
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CONCRETE/THE YEAR PAST: **the model of the projected Sydney, Australia National Opera House by Architect Jorn Utson from the recent Museum of Modern Art Exhibit: Architecture and Imagery—dramatizes the versatility of concrete as a medium of architectural expression. Dynamic uses of this plastic material are found yearly. A/E NEWS has endeavored to recapitulate some of the findings, and interesting applications of this past year.**

Two thousand years ago, concrete was expertly used in building the glories of Imperial Rome. With the dissolution and dispersal of knowledge in the ancient world, the use of concrete rode to an historic eclipse until almost sixty years ago.

Empirically through experimentation, the 18th century advance in formal and applied mathematics together with the later impact of the industrialization of Europe stirred the renascent use of concrete.

The work of the French engineers and architects—Hennebique, Coignet, and Freysinnet gave the material a bold impetus toward a dramatic rekindling of architectural form.

In the ensuing years, Corbusier, Candela, Maillart, Nervi, Torroja and Wright have become a few of the many world-famed names associated with a venturesome and plastic expression in concrete materials.

The vernacular of architectural aesthetics and of engineering technology has been extended to incorporate terms such as plasticity, formability, prestressing, precast, lift-slab, tilt-up, admixtures, and others ad infinitum.

The ability to define categorically the design potentialities of concrete as well as its physical properties has produced a dynamic working tool in creating today's buildings, many of which have come to be recognized and enjoyed as *beautiful* (the neglected Vitruvian ideal). The roots, into which the aesthetic spade has been thrust, are in the mundane, almost bland, plodding soil of applied materials and methods research. From this source is extracted and derived the ultimate architectural and structural character of our buildings.

The architect, as a creator of environment, responds to the insights gained from the availability of applied research. The consulting engineer interprets his concepts into structural meaning by a logical order of various elements whose behavior he can predict and control.

Accordingly, the wellsprings of one's professional facility may lie deep in the continuing process of materials and methods investigation.

In the United States, the American Concrete Institute, the Building Research Advisory Board, the National Bureau of Standards, the American Society for the Testing of Materials are among the many instruments of conveying developed research and standards to professional groups.

Their work is supported and correlated by industry, the professions, and research centers of the universities and colleges.

Eventually these findings, resolved into recommended standards, are absorbed by all sectors of the building industry.

A/E NEWS has endeavored to recapitulate and illustrate some of the findings, interesting applications, recommendations and standards of 1958.

PRECAST CONCRETE

The rapid growth and development of the use of precast concrete construction has created a considerable amount of improvisation and experimentation in the materials and methods of erection. There is a growing amount of standardization, although incomplete, which has developed far enough to establish certain patterns for eventual standard methods and materials.

Precast folded plate roof

In the new ACI headquarters building, (*Figure 1.*) designed by Minoru Yamasaki, of Yamasaki, Leinweber and Associates, Architects and Engineers, a reversed fold, folded plate roof cantilevered from each corridor wall was used with deep X-shaped beams, having diamond-shaped openings for skylights, and employed as tie beams across the corridor (*Figure 2*). The design was for cast-in-place construction but specification permitted a precasting option which was selected because by precasting the sections upside down, sharp formed lines on the exposed surfaces were achieved.

A transverse joint detail was developed which depended upon ⅜ inch plates running along each edge of the section, welded top and bottom for moment resistance, and a longitudinal weld detail across the corridor was used with the approval of the structural engineers, Amman and Whitney of New York and Milwaukee. A casting schedule calling for two units per day required 1,500 psi concrete at 24 hours.

The concrete mix for the folded plate members had to meet severe requirements. First, the 72 different detail types of metal reinforcement, inserts, etc., in the 3½ inch thick slabs made placing difficult and slow and required a ⅜ inch maximum-size aggregate. A retarded set was required, due to the 95°F mid-summer heat at the time of casting. Finally the specifications required a 4,000 psi average strength at 28 days.

Initial curing under wet burlap for 24 hours was followed by a sprayed-on liquid membrane-forming white pigmented curing compound. The 28-day strengths averaged 5,100 psi.

After curing, all units were turned over for patching and finishing on the top side. Units were numbered and measured to determine over-and-under-width tolerances. An erection sequence was prepared to avoid cumulative overrun.

Roof units were erected as simple beams on falsework at the window line and the corridor bearing wall. Two steel shims 4 inches high on the bearing walls plus the point support on falsework gave a stable three point bearing that permitted adjustment to match adjoining units. After completing main welds above the corridor and tie-down welds to dowels in the bearing wall, non-shrink grout was used to complete the center joint and bearing on the wall. Transverse roof joints above the welds were completed to sharp edges with a patching grout containing a polyvinyl acetate emulsion as an admixture and as a bonding coat. A camber of 1¼ inches was provided at the window line; immediate deflections averaged 5/16 inch. The windows are fixed by a sliding joint to accommodate deflections due to live load and creep. The exposed roof slabs are covered only by a sprayed vinyl treatment so that the architectural integrity of a concrete surface is retained.

PRESTRESSED CONCRETE

Yearly, prestressed precast folded plate concrete slabs as reported by the ACI offer a tremendous potential for their widespread use in buildings for roof, floor and wall construction and in highway bridges. The widespread use is deemed probable because a relatively low capital investment in prestressing facilities will produce a complete span range of folded plate products limited only by the producer's ability to deliver and erect. The cost of folded plate structures promises to be competitive with all other building materials for long spans and heavy loads.

The prestresed folded plate system offers the inherent advantages of concrete construction—strength, fire resistance, and low maintenance for every building type, and design and construction economies are possible in the 50 to 120 foot span range.

PCI report

Durability tests, fifty in number, are

currently being conducted at Kansas State College according to the Prestressed Concrete Institute. Numerous companies soon will develop larger prestressing facilities. A liaison team has been created to coordinate PCI and Portland Cement Association research activity at the new prestressed laboratory facility at Spokane, Wash.

A contrast in project sizes and building types, in the use of prestressed elements, is given in the new 22-story Norton Building (*Figure 3*), at Seattle, Ore. and the Episcopal Church (*Figure 4*) at Fort Lauderdale, Fla.

NEW ACI STANDARDS

At its 55th annual convention held in February of this year, the American Concrete Institute revised its basic standard on measuring, mixing and placing (ACI 614-42) in addition to adopting standards for two recommended practices: one for mix proportioning for structural lightweight concrete and the other, for hot weather concreting.

Measure, mix and place

The latest ACI report updates the old standard by the inclusion of an outline of practices which have generally been found desirable for prime results in measuring and mixing ingredients for concrete.

Although many of these recommendations are applicable to special types of concrete, it is conventional concrete to which they specifically apply. Emphasis is placed on a comparatively high standard of practice rather than common practices; recommendations are made with the thought of permitting the user flexibility in his specifications to the extent he considers worthwhile for his particular project.

The main ACI objective in this recommendation is maximum uniformity, homogeneity, and quality of concrete in place, therefore special consideration is given to those practices which have been found to contribute most to this aim. For clarity, illustrations of good and bad practice are included.

Structural lightweight concrete

Recommended practice for mix proportioning for structural lightweight concrete is given in a standard intended as a supplement to the ACI standard, *Recommended Practice for Selecting Proportions for Concrete* (*ACI-613-54*). A procedure is described for proportioning structural grade concrete containing lightweight aggregates. This procedure does not require the use of values for specific gravity or absorption of the aggregates but utilizes a *specific gravity factor*. Use of this factor is illustrated and examples are included for proportioning both air-entrained and non-air-entrained mixes.

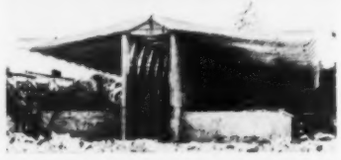


Figure 1 (above). Recently completed ACI Headquarters Building presents a delicate tracery in its pierced concrete block screen walls. Designed by Minoru Yamasaki, Leinweber and Associates, Architects and Engineers. Figure 2 (below). Folded plate roof cantilevers 19 feet from center corridor load-bearing walls. Structural unity established by welding connections across corridor to dowels in walls.

Figure 3 (above). Seattle's 22-story Norton Office Building has no interior columns. Architects: Skidmore-Owings-Merrill; Structural Engineers: T. Y. Lin Associates. Figure 4 (below). Prestressed units utilized for St. Ambrose Episcopal Church in Fort Lauderdale, Fla. Architects: Johnson and McAlpine; Structural Engineer: H. J. Ross Associates.

Structural lightweight concrete is defined as having a 28-day compressive strength in excess of 2,000 psi and an air dry unit weight less than 115 lb. per cubic foot. Many expanded shales, slates, clays, slags, and some natural aggregates, are used in this class of concrete.

The high values of absorption which may continue at an appreciable rate for several days make it difficult to determine correct values of absorption and specific gravity of the aggregate. Because of these complications, the established relationships cannot be applied with the same confidence as for normal weight aggregates. Due to the difficulties involved in the determination of these values, a method of proportioning is suggested which does not require their use.

Hot weather concreting

This ACI standard provides information for minimizing the detrimental effects of hot weather on concrete. Specific methods are described for: (1) reducing concrete temperature by proper attention to ingredients; (2) methods of production and delivery; (3) care in placement, protection and curing. Information is given on the use of admixtures to reduce mixing water requirements and to retard setting. Emphasis is made of the importance of meticulous attention to the use of standard procedures in testing concrete made in hot weather.

Numerous factors have increased the problems of concreting in hot weather including the use of more finely ground and more rapidly hardening cements, handling of larger batches of concrete, use of thinner sections, and increased speeds in all construction operations. Procedures are suggested for reducing the hazards of hot weather in the more usual classes of construction.

Recommendations

For minimizing the harmful effects of hot weather on poured concrete: (1) ingredients may be cooled to keep the temperature of the concrete from being excessive at time of placement; (2) cement content, because of heat of hydration, should be maintained at the minimum permitted by the work; (3) protecting forms and reinforcing steel from direct rays of the sun and cooling by sprinkling; (4) suitable scheduling of delivery and placement to avoid excessive mixing or delays contributing to concrete stiffening; (5) in place protection to minimize drying and absorption of heat.

Pound for pound, the mixing water has the greatest effect of any of the ingredients in concrete temperature since it has a specific heat about 4½ to 5 times that of cement or aggregate.

The use of ice as a part of the mixing water is highly effective in reducing concrete temperature since, on melting alone, it takes up heat at the rate of 144 Btu per pound. To take advantage of the heat of fusion, the ice must be incorporated directly into the concrete as part of the mixing water and completely melted by the time mixing is completed.

ASPECTS OF DESIGN ANALYSIS

Among the papers delivered at the ACI convention, George C. Ernst, Professor of Civil Engineering and Director of the Engineering Experimental Station, University of Nebraska at Lincoln, discussed *Torsional Resistance of Reinforced Concrete*. A brief summary is as follows:

Torsional stresses in reinforced concrete generally develop as a secondary effect of flexure, such as in the spandrel beam of buildings. As a secondary effect, torsion is rarely a controlling factor in design, and therefore has received relatively little attention. Nevertheless, the increasing application of reinforced concrete to *unique and unusual structural forms* in which torsion may occur as a primary effect focuses attention on the need to develop a better understanding of torsion and stiffness in all situations. (*see Forecast, p. 4*).

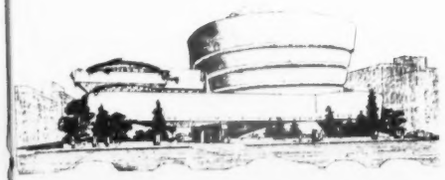
Considering the problem of torsion as a whole, we need analytical design procedures supported by adequate experimental information for both conventional and prestressed reinforced concrete when subjected to static and dynamic loadings. Loading conditions must include combinations of torsion with flexure and direct stress over a broad enough range to cover all critical applications. The present extent of our knowledge is limited to statically applied torques in combination with flexure.

Computer engineering

At the University of Arizona Engineering Experiment Station, a new structural design manual for standard prestressed bridge beams has been prepared by K. K. Kienow, UA instructor in Civil Engineering. Kienow has worked out a special method of prestressed bridge design which usually is a tedious, time-consuming activity using deck calculators. In the new method of analysis developed by Kienow, the IBM 650 Computer of the Numerical Analysis Laboratory at the UA College of Engineering was used.

By this method and through the amazing speed of calculation of the computer, more than 16,000 different bridge designs were made in just a few hours. Ordinarily, several days are required for the calculation of computations for just one bridge. Now any designer can obtain the results for a particular bridge in a few minutes of study of the comprehensive tables of results in this new manual. A similar study now under way will include "The Economical Optimization of Structural Frameworks."

CONCRETE:
the year past



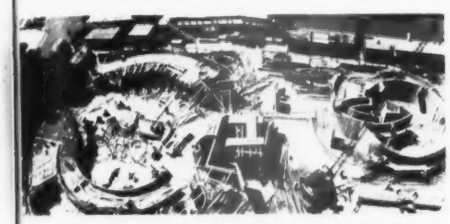
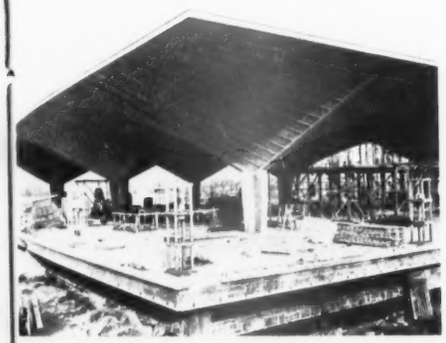


Figure 5 (above). Sketch of the Solomon R. Guggenheim Museum designed by the venerable Frank Lloyd Wright. Figure 6 (below). Designed with no expansion joints, structure required absolute concrete control for its continuous ramps, intricate cantilevers and column shapes.



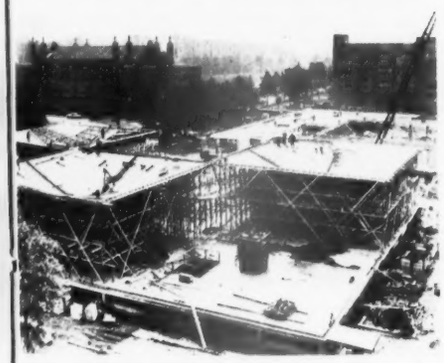


Figure 7 (above). Marcel Breuer's Hunter College Library uses 4 hyperbolic paraboloid shells joined together to form one reversed "umbrella — each supported by a "roman-cross" column. Total of 6 units form entire structural system. Figure 8. (below) Six shell units were cast separately in an alternating pattern. Edges were tied with dowels.

ADMIXTURES

Admixtures, properly chosen and used, have an important place in concrete construction. Admixtures may aid in improving many desirable properties of concrete, and their use can be advantageous both from the standpoint of concrete quality and cost. Two unusual projects which were facilitated by the use of admixtures, and an investigation into the effectiveness of admixtures on moisture control of slabs-on-ground are given below:

Guggenheim Museum

The soon-to-be dedicated Solomon R. Guggenheim Museum, (*Figure 5*) designed by Frank Lloyd Wright, required casting of concrete in irregular forms because of its many curved surfaces. The two-wing structure has ramps, domes, cantilevers, tapered columns and other unusual shapes for its main structural elements. Careful advance planning and attention to detail in laying out formwork and in concreting were required. Superior and crack-free concrete was essential to the construction. The building is designed *without any expansion joints* —in order to expand and contract as a unit—an unusual feature for a concrete structure of this size (*Figure 6*).

To achieve quality control in the concrete, engineers worked side-by-side with various trades in placing formwork and setting the reinforcement. To offset hot New York summer temperatures, improve the workability of the concrete, and facilitate placement under the conditions of the usual hot weather problems of cold-joints, loss of slump and honey-combing—a retardent admixture for slower heat development and less water use was employed.

In hot weather, as is well known, concrete usually sets within one or two hours and almost immediately at 90°F temperature. Ease of placement was especially important in sections where the mix has to be worked between the complex multi-layered reinforcement. The admixture functioned to keep the concrete from hardening long enough for it to be properly vibrated into place.

Each day's concreting varied from 40 to 200 cubic yards. Each of the circular wings were concreted one level at a time. For each ramp level of the main exhibit gallery, an average of three separate concreting operations were required and ten individual ones for the 11 foot high interior wall. Ramp framework was supported directly on the level below. The 5 inch exterior wall, which rests on a slab connected to the ramp, was united on the interior against curved plywood forms.

Specifications called for a 3,500 psi lightweight concrete with a typical 3 to 4 inch slump. Fourteen ounces of the heat retardent admixture were added during hot weather. As a result, according to Euclid Contracting Corp. spokesmen, the general contractor, shrinkage cracks were entirely eliminated.

The Breuer Library

Architect Marcel Breuer's design for New York City's Hunter College Library uses four hyperbolic paraboloid shells joined together to form one reversed "umbrella" and combines in a structural system six huge concrete "umbrellas," each supported by a concrete column.

The 120 x 180 foot structure is supported on only six concrete columns. Each column resembles a roman cross in section and each tapers down from the low point of each "umbrella" ten feet above the floor.

"The 60 foot clear spans and 30 foot cantilevers would have been prohibitive in cost," according to Mr. Breuer, "if a thin shell had not been used." The high point of each "umbrella" is along its outer edge elevated 23 feet above the floor.

The 3½ inch shell required a concrete of little water content in order to achieve high strength and to keep it from running down the planes of the slopes of the shell—pitched as steep as 45 degrees near the column and averaging 36 degrees of pitch elsewhere. In this project too, a retardent-desifying admixture was added to the mix to produce these working characteristics. The 2 inch slump concrete was mixed sufficiently cohesive to remain in place without sliding.

Strengths of 3,000 psi were obtained in seven days, making early form stripping possible, and 4,000 psi in 28 days for the lightweight concrete. Specifications called for 3,500 psi in 28 days.

This structural system is considered highly efficient and low in cost for single story buildings, according to Maurice Barron, partner of Farkas and Barron, structural consulting engineers to the architect. The 3½ inch thickness is a minimum requirement under the New York City Code. A 2 inch shell would ordinarily be adequate for structural purposes.

Midpoint ribs, triangular in shape and located in the valley formed at the juncture of two paraboloids, join together the four hyperbolic paraboloid sections. The 5 foot 4 inch wide ribs vary in thickness from 8 inches at the top to 14 inches at the shell's low point.

This project is believed to be among one of the first hyperbolic paraboloid structures of this size to be used for non-industrial buildings. Three large industrial structures utilizing hyperbolic paraboloid shells have been built in the Dallas, Texas area from designs of the noted architect Felix Candela of Mexico City.

The first 60 x 60 foot "umbrella" was concreted in approximately eight hours, requiring 60 yards of materials. The succeeding five "umbrellas" required much less time for the preparatory work and the concreting.

The reinforcing consists of prefabricated heavy gauge (0.3 inch) wire mesh (6 by 6 inch spacing) which has proved a time saving device supplemented by reinforcing bars along the compression ribs. The steel mesh reinforcing was placed by crane and positioned on 1 inch high chairs attached to the plywood forms, facilitating concrete placing. The vertical reinforcing within each individual column consists of 32—#11 bars, 12—#8 bars and column ties are #4 bars spaced 12 inches on centers. The thickness of the stem of the cross is 15 inches (*Figure 7*).

Many unusual problems were presented in the construction of this building's roof. Each "umbrella" was formed by a series of straight members on variable slopes by thin 2 foot x 8 foot plywood panel forms which were easily warped into shape on the straight members.

The six shell units were cast separately in an alternating pattern (*Figure 8*). The edges were tied together with dowels. Work started at the north end of each "umbrella" and proceeded counter-clockwise by placing concrete at the highest part of each umbrella, at this outer edge and then proceeding downward to the low point of each quadrant. The first quadrant required 2½ hours to concrete. Thereafter, work was speeded as the assigned 14-man crew gained experience and ready-mix concrete deliveries were accelerated. The inclusion of admixtures deccelerated setting. Rapid bleeding after placement further reduced the slump, enabling the unset concrete to remain on the steep slope without falling away. Concrete was vibrated to the material placed earlier and a cold joint was prevented by the admixtures which modified thermal shock. The same technique was used to join the last strip of concrete to the first one, placed eight hours earlier.

Roof insulation consists of a 3 inch thickness of perlite insulation (expanded volcanic mineral material) cast directly on the concrete roof and topped with conventional mineral finished roofing felt applied in strips of two alternating colors, to form a pattern of curved and striped surfaces since the roof will be viewed from neighboring taller campus buildings.

BRAB study of admixture effect

The Building Research Advisory Board, under contract between the FHA and the National Academy of Sciences recently reviewed the effectiveness of admixtures in concrete for controlling the transmission of moisture through slabs constructed on the ground. A test method was developed for comparing the resistance of moisture transmission of concrete slabs containing an admixture

(*Continued on next page*)

with presently acceptable means of preventing excessive transmission through slabs.

The FHA requires that all habitable spaces with slab-on-ground construction be built so that neither excessive water nor dampness will penetrate the slab. The purpose of the BRAB study was to provide FHA with authoritative information as to the effectiveness of admixtures as protection against ground moisture and vapor penetrating slabs-on-ground.

Subsequent research revealed that there is a lack of pertinent data, standards and criteria for moisture transmission through slabs-on-grade. Several nationally known technical sources consulted related either to particular elements of slab construction or the entire construction system. The BRAB report did not concern itself with admixtures, per se, but in their application to the FHA problem.

Natural properties of concrete

Regardless of its composition, concrete is still a hygroscopic material. Therefore, it will transmit moisture if the humidity on one side differs from the other. The greater the cement content in relation to the original water content, and the longer the period of curing, the lower will be the rate of moisture transmission under given conditions. BRAB reports that neither experimental data nor theoretical considerations indicated that the use of *any admixture* will modify the properties of concrete to permit it to serve the functions of a vapor barrier or a granular base nor would it be capable of greatly reducing vapor permeability in slabs-on-ground. A further conclusion was that admixtures provided no protection to the slab against a rise of liquid water by capillarity through soil.

Need for more data

The BRAB committee stated that data is needed based on rates of moisture transmission through concrete slabs under a variety of design conditions. A recommendation is made for a laboratory testing program to develop data and subsequently solve problems in this technical area.

Composite test assembly

A research step beyond the test method utilized for the admixture study was expressed as desirable—such as the incorporation of a floor covering into a test assembly of a composite structure consisting of membrane, concrete, adhesive, and floor covering, or any combination of these. Each component has specific performance capacities but a summary and individual study of the *quality* of each component, subjected to an investigation of moisture content resistance, would establish critical data for understanding the mechanism of moisture transfer under a wide range of ambient conditions on both sides of the assembly.

ARCHITECTURAL FINISHES

A growing architectural emphasis on color and texture in recent years has focused attention on the almost unlimited variation of these characteristics to be found in exposed aggregate concrete panels.

Although finely etched small aggregate is used for detail and tracery, the trend to the bold, rugged use of relatively large aggregate (exposed by removing the matrix ⅜ inch to ¾ inch or more) for flat fascia indicates the desire or need for "readable" textures at considerable distance, thereby providing contrast to adjacent surfaces of smooth or polished metals or glass materials.

This panel may function structurally as well as decoratively when used as an exterior form against which concrete is shot or cast, applied as a veneer, or installed as a curtain-wall component.

Figure 9. St. Marks Church in New Canaan, Conn. makes wide use of concrete pre-cast units and infilling architectural concrete panels. Architects: Sherwood, Mills, and Smith. Rendering: Kempa.

Generally natural aggregates are being used, but glass, ceramics, and other manufactured aggregates lend color, brilliance and interest when appropriately used.

A manual of recommended practice for cast-in-place architectural concrete finishes in which a method is furnished for "more accurately evaluating contractors' quotations" for concrete finishing has just been published by the Concrete Industry Board of New York. Eight categories of detailed procedure are given. In the near future, the CIB will publish a guide on off-site concrete fabrication finishes.

PLASTICS AND CONCRETE

To obtain unusual architectural effects in concrete surface treatment by pattern or textures, plastic forms are being used. The concrete surface can be either glossy smooth or textured. Finish is achieved by thorough consolidation of the mix that would ordinarily be used in the product. Pattern decoration is achieved by vacuum-forming the plastic sheet over wood, plaster, metal, glass or other pattern materials. Almost any intricate or bold pattern may be used, limited only to maintaining sufficient draft along pattern lines and insuring that the depth of the depressions is less than the width. Plastic-formed concrete has a smooth finish and smaller amounts of pigment are required for color due to the higher reflectivity. Although costs are higher for this treatment, custom-designed effects are possible.

Integral FRP formwork

The use of fibrous glass reinforced plastic form boards have recently been used as a permanent form for a 2 inch thick gypsum concrete poured roof deck in one industrial building. It is reported that the formwork, a lightweight rigid material, laid in place between steel subpurlins, provides a white-matte interior ceiling finish that is fire safe, possesses acoustical (75 per cent absorbent), (light reflection 60 per cent), and thermal insulation properties. This reinforced plastic classification has the advantages of impact resistance, low moisture absorption and chemical reagent resistance. Through judicious application it should prove an interesting accessory to concrete construction.

Concrete adhesives

Concrete adhesives have indicated outstanding properties for bonding concrete, with old-to-new or old-to-old concrete. Their effective properties are becoming well known in the adhesion of both old and new concrete. Applications are being found in the construction and maintenance of concrete structures: buildings, bridges, roadways, and for patching, overlaying, surface sealing, non-skid surfacing and for expansion joints.

Various concrete adhesives are of the epoxy resin-based types: (1) epoxy resin cured with a tertiary amine (urea or melamine condensed with aldehyde); (2) epoxy resins cured with an amide; (3) epoxy resin modified by a polysulfide liquid polymer. This latter type is essentially a synthetic rubber in liquid form which rapidly cures by addition of an accelerator. It has also proven its value as an excellent concrete expansion joint medium.

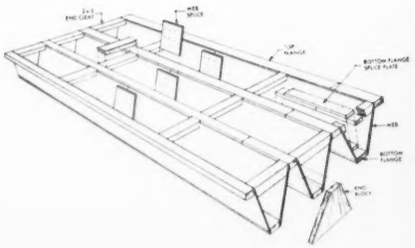
Other types used as adhesives and grout are: PVA (ASTM classification for a polyvinyl acetate based adhesive either as a PVA paste or grout).

The epoxy resins are formulated in two packages, and may be brushed applied and mixed at the time of application. The PVA paste (as an adhesive) is a brushable, single package mix. A single coat is applied to an old concrete surface, and after a two to three hour drying time, new concrete is applied over the dried film. The epoxy group generally has a 3½ hour set time. The concrete adhesives are essentially competitive in price, applied, from five to nine cents per square foot. The PVA grout containing a polyvinyl acetate emulsion is troweled over a concrete surface and fresh concrete is applied over the wet concrete.

Figure 10. A polysulfide compound utilized to seal sections of mortar and stained glass assembly (shown here) in addition to all masonry joints and metal flashings joined to concrete structure of First Presbyterian Church of Stamford, Conn. Architects: Harrison and Abramovitz.

products, equipment, materials

A/E NEWS offers editorial coverage of recent developments by industry. Inquiry cards for further information face pages 12 and 36.



Structural system

MFR'S DESCRIPTION: a proprietary structural plywood system called "Trofdeck," used in over 500 buildings in Great Britain and Canada, has been licensed for American manufacture and distribution by the Berkeley Plywood Co.

USES: for light commercial buildings—applicable for roofs, walls, floors, ceilings and concrete form work.

SPECS/FEATURES: system consists of a parallel arrangement of troughs fabricated of plywood and kiln dried lumber sections in standard units on a 16″ width module. System is claimed capable of supporting loads 80 times its weight and spanning distances 40′-60′ without column support. Design flexibility, competitive cost, appearance, acoustical and insulation advantages stressed. Standard units are based on 16″ module o. c. and supplied in panel widths 16″, 32″ or 48″. Over-all depths range from 5 ¾″ to 15 ½″. Weight per square foot from 2.1 to 3.7 lbs. Other engineering data and load/span tables available.

AIA file no. 19-F

MFR: BERKELEY PLYWOOD CO.

Circle 170 for further information

Silent luminous switch

MFR'S DESCRIPTION: Pass and Seymour, Inc. has introduced the "Rocker-Glo" switch which is luminous in the dark and can be operated silently by either a pushing, rocking, rolling, flicking or pressing action.

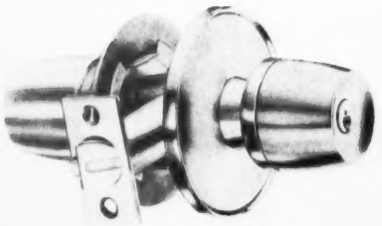
USES: residential and related lighting control.

SPECS/FEATURES: switch unit #2221 available in "Despard" type with strap or interchangeable, and with a narrow rocker for a tumbler switch plate. Single or double pole, three or four-way, and rated at 15 or 20 amps, 120/277 v. AC. Available with both pressure and screw terminals. Silver buttons mounted on vertical contact arms at point of least vibration.

AIA file no. 31-D-4

MFR: PASS AND SEYMOUR, INC.

Circle 171 for further information



Heavy-duty lock

MFR'S DESCRIPTION. Sargent & Co. has announced the "Magna-Lock" line of heavy-duty bored locks and latchsets designed for a greater torque resistance than similar units currently available.

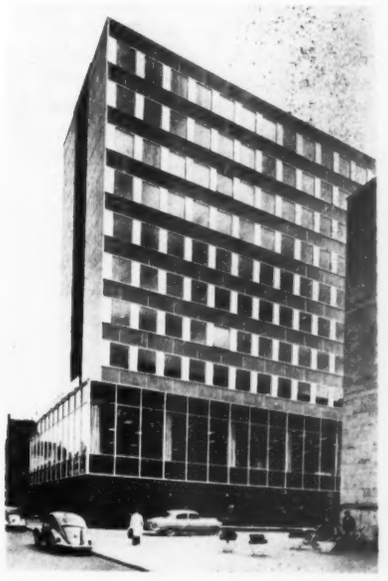
USES: various door applications including hollow metal types.

SPECS/FEATURES: fits type 161 cutout. Employs interlocking latch tube and aligning tube design. A self-adjusting front fits both flat and beveled doors. Completely reversible without disassembly. Designed for use also in hollow metal doors by eliminating need for any special lock reinforcement. Available in 2 ¾″ and longer backsets and all standard functions. All designs identical to mfr's "IntegraLock" line and a new 2¾″ rose has been added. Nylon is used—in lock for anti-friction operation, as insert in latchbolt, as bushings, and in aligning tube thread to help secure roses. Variety of metals: bronze, brass, stainless steel, chrome on brass, and anodized aluminum. Various finishes: polished satin, bright or dull.

AIA file no. 27-B

MFR: SARGENT & CO.

Circle 172 for further information



Incombustible panel

MFR'S DESCRIPTION: an incombustible, weatherproofing building panel, Weldwood Glasweld, for interior and exterior use has been introduced to the American market by United States Plywood Corp.

USES: curtain wall and fascia panel components, soffits, canopy ceilings, partitions, wainscoting, plain or perforated ceilings, kitchen and bathroom walls and counter tops.

SPECS/FEATURES: available in 1/8″, 1/4″ and 5/16″ thicknesses, stocked in 48″ x 96″ sheets. Panel is an inorganic asbestos reinforced unit with a permanent all mineral enameled surface. Finishes in range of ten colors and includes two patterns: a spatter and a linen weave. Also available in perforated style. Additional 20 colors and patterns available on custom order. Panels are Belgium import, where they have been manufactured for past five years. Has ceramic-like appearance, but can be cut with

carborundum wheel on portable power saw, scored and snapped. Variety of installation treatment details available. Recent use by Architect Ralph Evans Hacker in design of Nanuet Junior-Senior High School, New Jersey. The Vroom & Dreisman Department Store in the Netherlands is illustrated. Architect is Prof. Putz of Heerlin, the Netherlands.

AIA file no. 23-L

MFR: UNITED STATES PLYWOOD CORP.

Circle 173 for further information

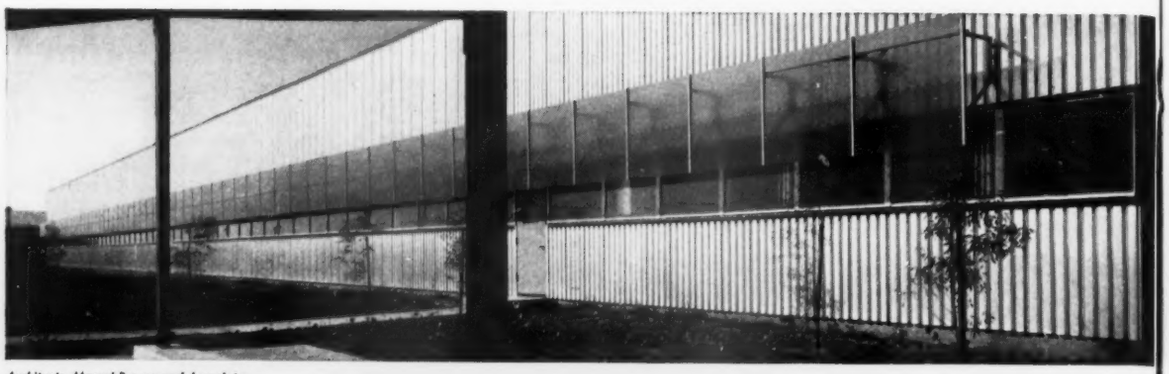
PLASTIC APPLICATIONS
Rigid vinyl sheeting

MFR'S DESCRIPTION: three rigid vinyl sheeting materials with improved properties of higher impact strength, greater light stability, or greater resistance to heat distortion have been announced by Union Carbide Plastics Co.

USES: various material applications depending on plastic formulations.

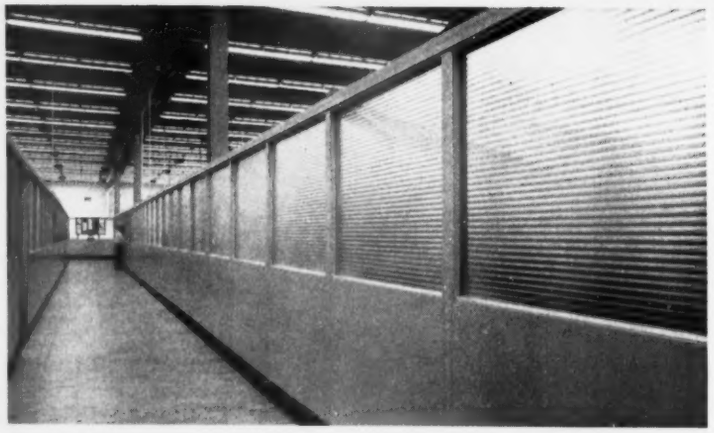
SPECS/FEATURES: dimensional stability, chemical inertness, non-flammability, and odorlessness properties stressed. Formulations can be formed, machined, drilled, trimmed and vacuum formed. (1) VCAB 3603 developed for high impact strength. Flexural strength of 10,500 psi and an Izod impact resistance of 15 ft. lb. per in. of notch. Available in calendered sheet form (continuous or cut to size) or as press-planished sheets 20″ x 50″). Thicknesses from 0.007″ to 0.030″ in standard width of 51 ½″. (2) VCAB-3604 has light stability coupled with high impact strength. Material supplied in translucent and opaque sheeting in a variety of colors. (3) VCAB-3606 designed for resistance to heat distortion for applications requiring proximity to heat or light sources

LIGHT DIFFUSING GLASS MAKES . . .



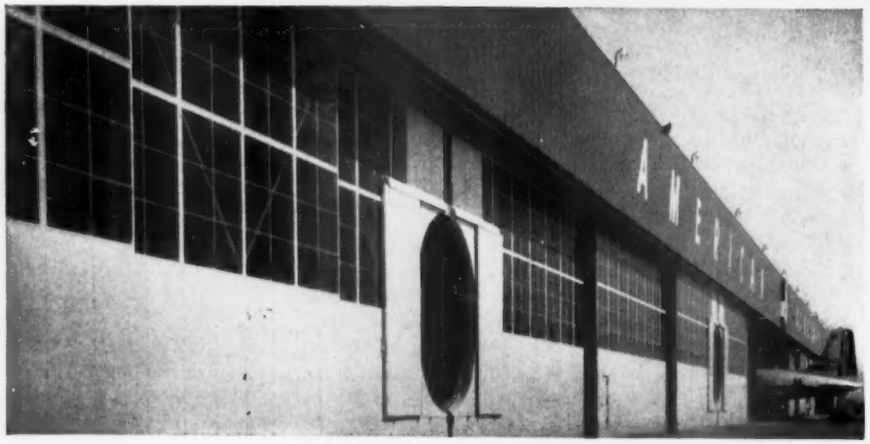
Architects: Marcel Breuer and Associates
Supervision: Craig Ellwood

A point of special architectural interest in the new Torrington Manufacturing Co. plant at Van Nuys, California is the sunshade of Coolite heat absorbing wire glass that spans the western elevation.



Complementing the spectacular new IBM offices in San Jose, California are these Hauserman partitions, glazed with lustrous Mississippi Broadlite glass.

Architect: John S. Bolles, San Francisco, Calif.
Partitions by: E. F. Hauserman Co., Cleveland, Ohio



1260 lights of ¼″ Coolite Wire Glass provide better daylight with protection, while absorbing excess solar heat in expansive American Airlines Hangar at Los Angeles International Airport.

Architect: Quinton Engineers Ltd., Los Angeles, California
Glazing by: W. P. Fuller and Company, Los Angeles, California

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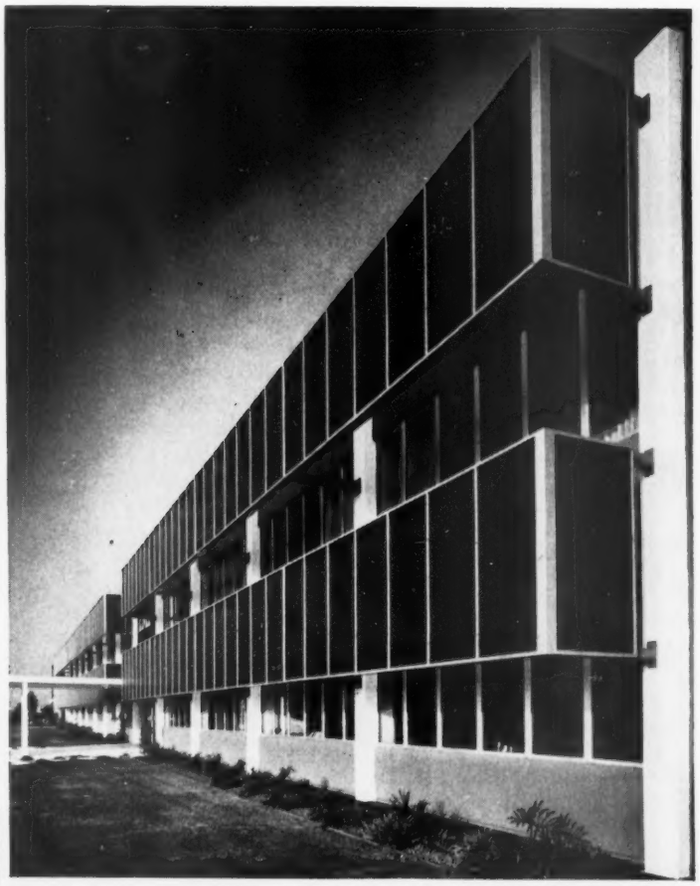
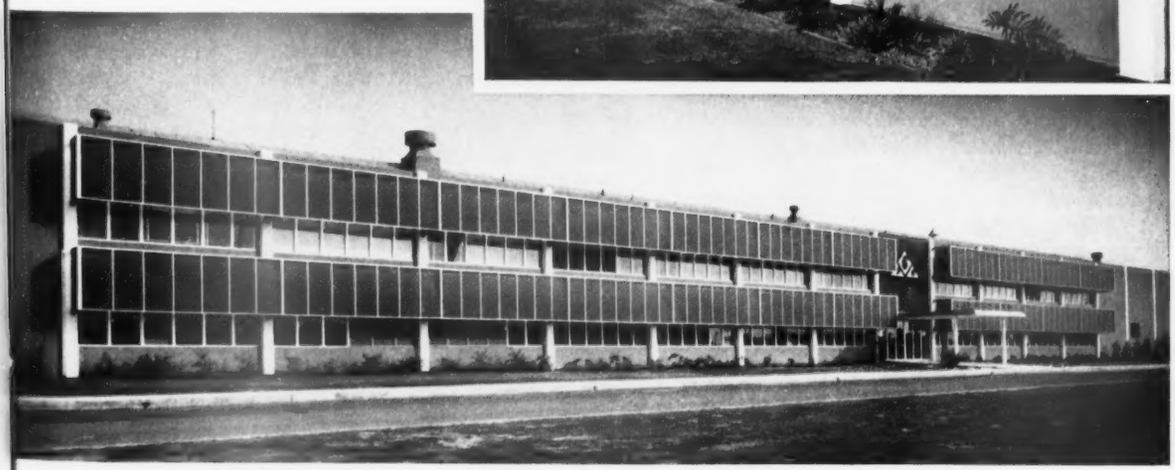
Write for new 1959 Catalog. Address Department 18.

A place in the sun is especially desirable when heat absorbing blue-green Coolite Glass is there to help employees see better, feel better, work more comfortably. A brand new concept in "extended screen" glazing technique that combines beauty and utility.

Growers Container Corporation, Fullerton, Calif. Architect: Falk and Booth, San Francisco, Calif.





GLASS COMPANY

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Circle 156 for further information

such as luminous ceilings or other light diffusers. Recommended distance between diffusers and light sources is 4". Available in clear and translucent white formulations. Complete engineering data and table of physical properties available.

AIA file no. 24

MFR: UNION CARBIDE PLASTICS CO., DIV. OF UNION CARBIDE CORP.

Circle 174 for further information

Epoxy-based roof decking

MFR'S DESCRIPTION: "Glason," a decking material based on Bakelite epoxy resins, is offered by Twinsburg-Miller Corp.

USES: "promenade" roof decking material.

SPECS/FEATURES: greater adhesion, weathering and durabilty at from ten to fifty per cent lower costs than conventional materials, stated by mfr. The epoxy system is especially formulated to provide an inherently waterproof surface for both foot and vehicular traffic. Coating is available in full range of colors and cannot crack. Coating is applied by serrated squeegee with colored aggregate as a continuous surface over a rubber mastic and woven glass combination, that is designed to provide a high resistance to impact. System is lighter in weight than conventional tile-cement combinations and therefore induces lesser loads on understructure. Surfaces are approx. 1/4" thick and claimed to offer a high degree of reflectivity. Mfr states use of a light color surface has shown temperature reductions in building below, as much as 15 per cent.

AIA file no. 12-A

MFR: TWINSBURG-MILLER CORP.

Circle 175 for further informaiton

Vinyl coatings

MFR'S DESCRIPTION: vinyl-based formulations are being used to protect wood, concrete,

stucco, cinder block, brick, porcelain and metallic surfaces.

USES: protecting industrial and commercial structures.

SPECS/FEATURES: emphasis is placed on factors of lower maintenance cost and higher durability. The decorative possibilities of vinyl systems have led to more commercial application. One such application is vinyl-based coating on interior columns in the UN General Assembly Building, New York City. Bakelite vinyl resins were selected, according to mfr, because of high resistance to scuffing and finger marking, resulting from some 3,000 visitors daily. Each column is coated in a two-tone formulation, off-white and charcoal gray. An average spray thickness of twenty mils, 0.020", was used.

AIA file no. 24-B

MFR: UNION CARBIDE PLASTICS CO., DIV. OF UNION CARBIDE

Circle 176 for further information

SLIDING DOORS

Combined sliding unit

MFR'S DESCRIPTION: a "knock-down" sliding glass door design using steel for the surround frame and aluminum for glass, with each metal isolated from the other, known as the "Combo Series," has been announced by Steelbilt Inc.

USES: residential and other building types.

SPECS/FEATURES: combined use of steel and aluminum stated to have various design advantages: (1) "Knock-down" mitred steel surround frame can be field assembled with the rigidity of welding; screw-fastened steel gussets used at corners. (2) Steel considered desirable for frame because it provides strength without bulk to maintain true alignment and positive seating at all sliding and interlocking points. (3) Installation possible in direct contact with structural materials without metal deterioration. (4) Withstands handling during "roughing-in" construction. (5) Can be painted any color. (6) Aluminum is considered logical metal for holding glass, weatherstripping, hardware, etc., because extrusion is more economical production process. (7) More delicate detail possible and painting eliminated in mullion assembly. Other features are: continuous stainless steel capping on sill track, mohair pile weatherstripping, stainless steel or nylon ball bearing rollers. Aluminum frames take up to ¼" plate glass, sealed in position by continuous vinyl extrusion. Exterior keyed cylinder stock available. Eight models available in various arrangements.

AIA file no. 16-N

MFR: STEELBILT, INC.

Circle 177 for further information

Prowler-proof unit

MFR'S DESCRIPTION: Peterson Window Corp. enters the sliding glass door field with its "Daisy" aluminum unit a "prowler-proof" ventilation detail.

USES: residential and related applications.

SPECS/FEATURES: medium-weight door. Unit locks firmly in "closed" and three "open" positions. Mfr points out that it is impossible to open the "Daisy" from exterior, because, short of breaking glass, lock cannot be reached from exterior. Widths from 6′ to 20′, and two heights, 6′-10" and 8′-0". Glazing in variety of glass, from ⅛" sheet to 1" sealed units. Sealed double glazed units carry five-year performance warranty. Specs and details on request.

AIA file no. 16-N

MFR: PETERSON WINDOW CORP.

Circle 178 for further information

DOOR CLOSERS

Concealed closure

MFR'S DESCRIPTION: P & F Corbin announces its "Hid-n-Rail" concealed door closer for interior doors. It is mortised in one location regardless of degree of door opening.

USES: surface mounted or concealed door closer.

SPECS/FEATURES: standardized mortise always in same location, two lengths of arms provide openings up to 180°, large expansion chamber, unit oil seal, ample power and control and a controllable back-check are stated to be advantages. The unit may be fully concealed in 1¾" doors, surface mounted or installed in 1⅜" minimum thick doors and concealed with trim plates. Economy of installation also stressed. Templating and installation data available.

AIA file no. 27-B

MFR: P & F CORBIN DIV., THE AMERICAN HARDWARE CORP.

Circle 179 for further information

Concealed closer

MFR'S DESCRIPTION: a concealed door closer, the "Top Railer," for interior doors, mortised in one location regardless of the degree of door opening, has been introduced by Russwin.

USES: interior doors.

SPECS/FEATURES: offered as an economical unit available for either mortised or surface mounting (complete with wrought metal cover in a range of finishes). Standardized mortise always in same location, two lengths of arms providing openings up to 180°, large expansion chamber, unit oil seal, ample power and control, fully controllable back-check. May be concealed in 1 3/4" doors, surface mounted or installed in 1 3/8" minimum thick doors and concealed with trim plates. Full templating and installation data available.

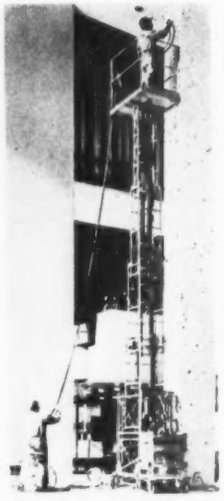
AIA file no. 27-B

MFR: RUSSWIN DIV.

Circle 180 for further information

Safety reject

MFR'S DESCRIPTION: a four-section steel garage door has been designed to physically reject the



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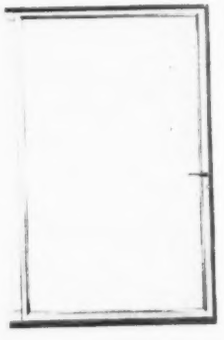

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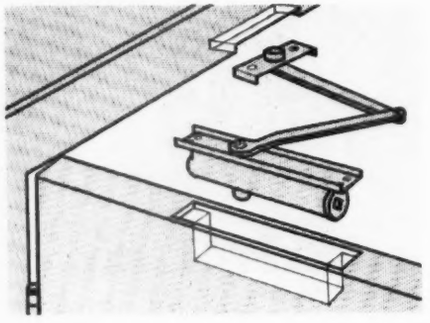

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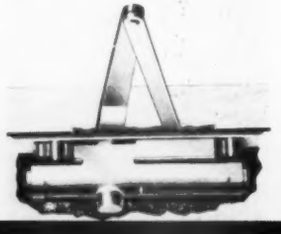


180

fingers or hand in closing. This safety feature is emphasized by the mfr, Steel Door Corp.

USES: residential and related garage application

SPECS/FEATURES: door designed by industrial designer, Carl Reynolds. Sections, made from Republic Steel's "Electro Paintlok" sheets, are treated so that checking, peeling or rusting are eliminated, according to mfr. A tapered track with adjustable rollers facilitates door closing without binding or friction, with tight jamb fit in closed position. A leveling bracket adjustment compensates for floor level variance. Unlatching mechanism permits door to be opened from any position along entire width. Two-position automatic latches make door latch automatically on both sides, locking even if floor level changes or if door is not completely closed. Nylon sheaves and rollers, and vinyl weatherstripping are used. The company offers a five-year warranty.

AIA file no. 16-D

MFR: STEEL DOOR CORP.

Circle 181 for further information

HVAC

750 HP package boiler

MFR'S DESCRIPTION: a 750 HP package steam generator, claimed to be the highest capacity fire-tube boiler manufactured since the establishment of the package boiler industry in 1935, is offered by Cyclotherm Div. National-U.S. Radiator Corp.

USES: industrial processing loads formerly considered "too big" for single package boiler.

SPECS/FEATURES: claimed 150 HP larger than its nearest competitor, the unit delivers 26,000 lbs. of steam per hr. at over 80 per cent efficiency. Unit is no larger than most 500 HP package generators. Over-all dimensions are: 28′-0″ x 9′-6″ x 10′-8″. Designed for heavy oil or gas, boiler adaptable to burn either LP-gas or light oil, as well. Modulation over wide range permits efficiencies of 80 per cent down to fraction of rated 750 HP capacity. Simplified automatic operation, compact size, no stack required and unified responsibility for operation stressed. Further technical information available.

AIA file no. 30-C-1

MFR: CYCLOTHERM DIV. NATIONAL-U.S. RADIATOR CORP.

Circle 182 for further information

Cooling tower

MFR'S DESCRIPTION: Marley Co. adds the "Underflow Aquatower" to its line of water cooling towers, stressing that the engineering design and utilization of modern materials in the unit are directed to architectural compatibility.

USES: cooling tower systems.

SPECS/FEATURES: all sides completely encased with ⅜″ corrugated asbestos cement board sheets presenting no openings or louvers, thereby simplifying appearance. No grillage by the user is required because of structural framework of steel basin which serves this purpose. Mechanical equipment located beneath the tower eliminating ladder climbing for inspection and maintenance. Hot water distribution basin has pre-assembled diffusion deck. For simplifying cleaning, cold water basin is sloped. Internal piping furnished by mfr. Complete specification and dimension data available.

AIA file no. 30-F-3

MFR: THE MARLEY CO.

Circle 183 for further information

Swimming pool heater

MFR'S DESCRIPTION: a packaged unit electric swimming pool heater is being offered by Coates Electric Manufacturing Co.

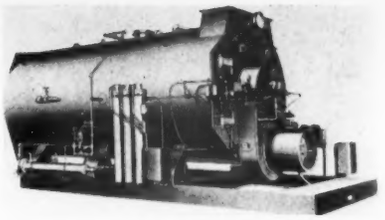
USES: home, semi-public and public pools.

SPECS/FEATURES: factory assembled and shipped with complete control panel attached. No wiring required between panel and heater. Compact size and ease of installation in small area spaces. Noiseless and flameless character of unit stressed. Several sizes and heat output capacity units available. Since electric system, no fuel tanks or supply lines needed. Mfr states total cost of installing unit is $100 under competitive fuel type.

AIA file no. 29-D-21

MFR: COATES ELECTRIC MANUFACTURING CO.

Circle 184 for further information



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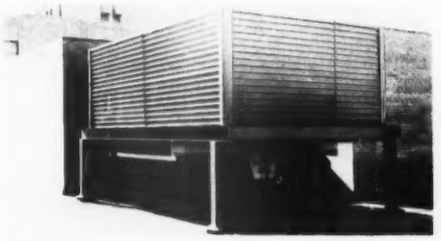

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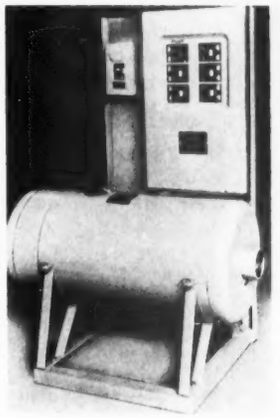

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185

Remote AC condensers

MFR'S DESCRIPTION: Dunham Bush Inc. recently introduced a line of "LRCU" large remote air-cooled condensing units available in capacities from 10 through 30 tons.

USES: AC applications requiring the use of water savers.

SPECS/FEATURES: five basic sizes. Each unit is basically a standard BC remote air-cooled condenser complete with "Brunnermetic" motor compressor, Heat-X liquid receiver, electric controls and refrigeration accessories all inter-connected and installed with casing of BC unit. Although dual motor compressors used in larger sizes, separate refrigeration circuits furnished for each motor-compressor. Electric controls for dual motor compressor units supplied with time delay step-start feature to minimize start up power requirements. Unit is factory leak-tested, evacuated and shipped with holding charge. Unit ready for operation once suction and liquid line connections made and electric supply brought to control box.

AIA file no. 30-F-3

MFR: DUNHAM-BUSH, INC.

Circle 185 for further information

Space filter

MFR'S DESCRIPTION: Mine Safety Appliances Co. has introduced its space filter, "Ultra-Aire," characterized as being versatile with exceptionally high dust carrying capacity.

USES: high humidity service in product and process control, as well as personnel protection.

SPECS / FEATURES: lightweight unit with replaceable fire resistant elements. Factory pretested units are stated to be at least 99.97 per cent efficient in particle removal of 0.3 micron diameter. Unit usually mounted in permanently installed steel frame. Includes continuous sheet of micro fiber web folded to ex-

pose 200 sq. ft. of structurally sound filter area in the 1,000 cfm size. Side panel waterproofed, non-combustible, honeycombed board. Both filter faces protected by second honeycomb structure, designed to protect filter folds from rough handling and serve as a prefilter. In 1,000 cfm size, filter weighs 9 lbs. and will carry 5 lbs. of atmospheric dust compared to conventional units carrying 2 lbs. before the pressure drop exceeds 2" of water column. Water vapor has no effect on filter. Three models available: standard plywood for 250° F; fire-retarded plywood for 350° F; and unit with protective finished steel to guard against chemical and moisture attack for service up to 1,000° F. Further engineering information available.

AIA file no. 34-K-6

MFR: MINE SAFETY APPLIANCES CO.

Circle 186 for further information

DOORS

Industrial operator

MFR'S DESCRIPTION: by addition of the "Mainline" series, Crawford Door Co. states that it offers most complete line of industrial door operators currently available.

USES: high lift, vertical lift and steel rolling doors, etc.

SPECS/FEATURES: three types, trolley jackshaft and jackshaft with chain hoist available in total of 56 different models in 1/3, 1/2, 3/4 and 1 HP units to meet all door requirements up to maximum 500 sq. ft. in size. Other features stressed: (1) one-piece unit construction in gear housing to provide durable, drip-proof casting; (2) worm and worm-gear speed reduction running in oil to eliminate V-belt problems; (3) exterior adjustable slip clutch for smooth start and door strike slippage; (4)

Mahon M-FLOOR Construction Saf

FIRST NATIONAL BANK BUILDING
Minneapolis, Minnesota

ARCHITECTS and ENGINEERS:
Holabird & Root & Burgee, Chicago, Illinois
Associate Architects:
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GENERAL CONTRACTOR:
Naugle-Leck, Inc., Minneapolis, Minn.

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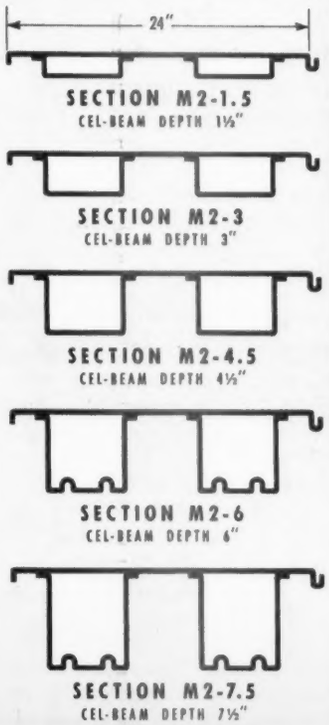
Safeguards This Imposing Structure Against Electrical Obsolescence!

Mahon M-FLOOR Cel-Beam Sections Provide Electrical Raceways Under Every Square Foot of Floor Surface

MAHON M-FLOOR SECTIONS



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- Insulated Metal Curtain Walls
- Underwriters' Rated Metalclad Fire Walls
- Rolling Steel Doors (Standard or Underwriters' Labeled)
- Steel Roof Deck
- Long Span M-Decks (Cellular or Open Beam)
- Permanent Concrete Floor Forms
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- Acoustical Metal Walls and Partitions
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MAHON

Circle 157 for further information

products, equipment, materials

fan-cooled, ball bearing motor; (5) automatic overload reset; and (6) automatic power cut-off when manually engaged.

AIA file no 27-C
MFR: CRAWFORD DOOR CO.

Circle 187 for further information

Aluminum door

MFR'S DESCRIPTION: an all-aluminum commercial-industrial door, the "Marvel-Lite," has been added to the Crawford door line.

USES: suited for service station installation and related uses.

SPECS/FEATURES: features safety torsion spring mechanism as standard equipment. Springs and grooved cable drums mounted at each end of full width shaft, permit door to ride tracks freely and quietly without binding. Springs adjustable to exact lift required to counterbalance door weight for frequent operation. Aluminum welded construction from hollow extruded sections for strength. Door will not rust, rot, warp or buckle regardless of climatic conditions, and also is fireproof, according to mfr. Maintenance requires occasional hosing. Lights and dented aluminum panels replaced easily.

AIA file no. 16-D
MFR: CRAWFORD DOOR CO.

Circle 188 for further information

Three-hour fire door

MFR'S DESCRIPTION: Aetna Steel Products Corp. announces receipt of a "Class A" three-hour fire test label from U.L. for its line of hollow metal doors featuring a one-point lock, replacing usual three-point lock.

USES: institutional, commercial and industrial structures.

SPECS/FEATURES: newly approved unit is estimated to make possible a reduction of at least 35 per cent in U.L. fire-rated "Class A" budget allowances. Units

available for faster delivery since doors are prepared for conventional mortising instead of preparation necessary to accommodate three-point lock. Safety feature for fire emergencies is stressed since only one bolt is operated by knob turning instead of three. Sold under trade name "Fyr-Chek," line includes pairs up to and including 7′-0″ x 7′-6″; also single doors up to 3′-6″ x 7′-6″. Other features: flush design, 18-ga. sheet construction, asbestos filled, 1¾″ thick, Lock equipped with ¾″ throw.

AIA file no. 16-B

MFR: AETNA STEEL PRODUCTS CORP.

Circle 189 for further information

DISTRIBUTION

Slim-depth switchboards

MFR'S DESCRIPTION: Federal Pacific Electric Co. has introduced a line of shallow-depth distribution switchboards.

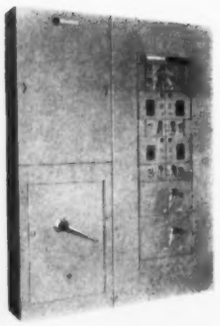
USES: medium size commercial and industrial buildings.

SPECS/FEATURES: variety of interchangeable distribution and control units of modular construction can be utilized with these switchboards which are only 14″ deep. These include Type AB circuit breakers, QMQB fusible switches, magnetic and manual motor starters, and plug-in breakers. Ratings: up to 2,000 amps; voltages up to 600 volts ac and 250 dc. Bus ratings are: vertical, 200 to 1,200 amps; and horizontal up to 2,000 amps. Three classes of incoming and distribution units available: one containing panelboard section; a second with main disconnect section and space for utility metering; and a third with panelboard section and space for utility metering. Sides of all units constructed of two 11 ga. formed and pre-punched channels, while rear plates are 11 ga. two piece, louvered to permit ventilation. The front is one-piece trim with rolled edges. Over-all height of units: 90⅛″ and depth of 14″. Width of incoming and distribution sections range from 29″ to 38″.

AIA file no. 31-D-2

MFR: FEDERAL PACIFIC ELECTRIC CO.

Circle 190 for further information



190

Package transformer

MFR'S DESCRIPTION: a semi-buried transformer enclosure is now available from General Electric in what is considered an economical "package" complete with transformer and two enclosed disconnects. The only item not included in the package is 48″ corrugated steel culvert pipe, a standard building item that is cheaper to buy locally.

USES: underground distribution systems.

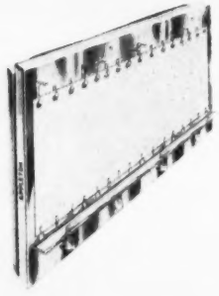
SPECS/FEATURES: the GE enclosure consists of a heavy gauge steel cover section to be hinged to the culvert pipe. All hardware, including hasp for padlocking, included. Top of cover dome projects 33″ above grade. Enclosure has factory applied baked paint finish. Units available from stock. Object of transformer, enclosure and disconnect "package," according to GE, is to reduce the cost differential between underground and overhead systems. Enclosure will accommodate standard pole-type transformers through 167 KVA, and two standard enclosed disconnects.

AIA file no. 31-B-3

MFR: GENERAL ELECTRIC

Circle 191 for further information

191



192

HOSPITAL USES

Film illuminator

MFR'S DESCRIPTION: a continuous surface, explosion-proof film illuminator, the "EFUX" is offered by Appleton Electric Co.

USES: hospital operating rooms and other hazardous areas.

SPECS/FEATURES: flush mounted units make possible the viewing of a sequence of films (X-ray) without space separations of previous models. Chrome-plated clips provided for holding film. Switches may be positioned at top of viewing surface. Stainless steel drip tray added for wet film viewing. Utilizes T-12 fluorescent lamps. Sealing and wiring, except line wires to connection block, are factory completed with each unit fitted with 110-125 v., 60 cycle ballast. Depth of units: shallow 1¾″ flanged cover unit for 4″ walls; a deeper unit for walls 6″ thick or more.

AIA file no. 35-K

MFR: APPLETON ELECTRIC CO.

Circle 192 for further information

193

Hospital luminaire

MFR'S DESCRIPTION: "Astrilite," a ceiling mounted luminaire designed as a three-compartment fluorescent unit providing four levels of illumination, is being offered by American Sterilizer Co.

USES: designed for patient rooms in hospitals.

SPECS/FEATURES: intended to replace floor, bed and wall-mounted lights currently in use. Features stressed are soft, general room light or high-level light for reading and close work at the head-end compartment. Full, bed-length illumination of "surgical" quality for examination or surgical preparation is available while safety night light at the foot-end of the fixture provides nursing convenience and patient comfort. Unit utilizes high-power factor ballasts, and an injected-molded Plexigas diffuser to eliminate glare. Substantial operational cost savings are claimed.

AIA file no. 31-F-28

MFR: AMERICAN STERILIZER CO.

Circle 193 for further information

Explosion-proof unit

MFR'S DESCRIPTION: a dead-end receptacle offering explosion-proof protection against vapors

and fumes is announced by Appleton Electric Co.

USES: hospitals and industrial establishments where hazardous areas occur.

SPECS/FEATURES: designed for flush wall mounting. In this unit, the "CPS" series, any arcing is confined within a plug combustion chamber of the dead-end receptacle. Live contacts exposed to the atmosphere which may contain volatile, inflammable, anaesthetical fumes or explosion vapors are eliminated. To complete circuit between receptacle and plug, single, one handed operation is all required. This featured stressed as desirable where non-mechanically trained personnel involved. Conduit hub sizes range from ¾" to 1" for Phase 1, two wire-three pole circuit, and for Phase 3, three wire-four pole. Receptacles have cadmium plated malleable iron body and adjustable sleeve, aluminum plug, and smooth canvas Bakelite cap.

AIA file no. 31-F-28

MFR: APPLETON ELECTRIC CO.
Circle 194 for further information

METAL PRODUCTS

Aluminum pipe

MFR'S DESCRIPTION: Alcoa announces its "Unistrength" pipe as a low-cost tubular aluminum product.

USES: piping requirements.

SPECS/FEATURES: seamless, one-piece pipe combining thin walls with standard wall thickness at pipe ends. Adaptable to all joining methods. Lengths of 40′ available in alloys 6063-T6 and 6061-T6 with schedule 40 wall thickness at ends. This permits use of standard aluminum fittings and flanges.

AIA file no. 29-B-8

MFR: ALUMINUM COMPANY OF AMERICA
Circle 195 for further information

Aluminum grating

MFR'S DESCRIPTION: "Anotec" is offered by Klemp Metal Grating Corp. as an architectural anodized aluminum grating for interior and exterior architectural applications.

USES: sun deflectors, spandrels, column facings, window-guards, room dividers, parapet and terrace railings, patio screens, grilles and louvers, etc.

SPEC/FEATURES: available in a number of colors: clear, gold, blue, copper-pink, green, black, brass, and red. Several colors are guaranteed sun-fast. Full-color descriptive literature available.

AIA file no. 14-B-4

MFR: KLEMP METAL GRATING CORP.
Circle 196 for further information

Diamond roofing/siding

MFR'S DESCRIPTION: diamond patterned aluminum roofing and siding accessories are being marketed by Kaiser Aluminum & Chemical Sales, Inc.

USES: farm home and commercial buildings.

SPECS/FEATURES: diamond pattern embossing is made to match company's "Diamond-Rib" building sheet. Ribbed sheets are also offered in 6′ to 16′ lengths. Other "Diamond-Rib" products are ridge roll, formed ridge cap, endwall flashing, green tinted translucent panels, coil flashing in lineal ft. rolls up to 48" widths.

AIA file no. 12-C

MFR: KAISER ALUMINUM & CHEMICAL SALES, INC.
Circle 197 for further information

Colors in aluminum

MFR'S DESCRIPTION: "Alumalure" is the tradename assigned to a series of colors developed for aluminum architectural products offered by Alcoa.

USES: offered flat, patterned, corrugated and ribbed aluminum sheets.

SPECS/FEATURES: 11 different hues available. The "Alumalure" finish is a baked alkyd enamel. Five of the colors are pigmented with aluminum to impart a high metallic luster. Alcoa states paint system permits aluminum sheets to be cut, drilled and formed without fear of staining, corroding, peeling or cracking of the finish. A broad range of applications suggested in industrial buildings, schools, store fronts, sports arenas, shopping centers and commercial signs. Matching color fasteners and acessories also available.

AIA file no. 15-J

MFR: ALUMINUM COMPANY OF AMERICA
Circle 198 for further information

Decorative steel

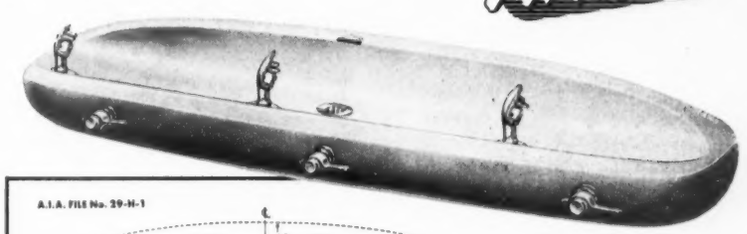
MFR'S DESCRIPTION: Pittsburgh Steel Co. announces its development of a sheet steel product that can be given a variety of rolled-in patterns, one of which has the appearance of fine-grain leather.

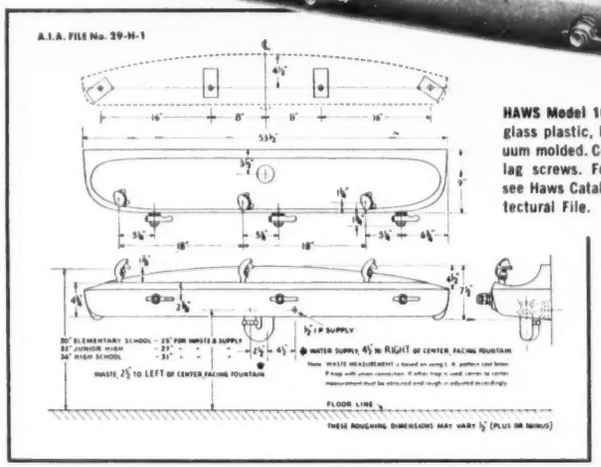
USES: wall surfaces, spandrel treatments, etc.

SPECS/FEATURES: available in commercial or drawing quality, the steel patterned sheet can be supplied in a variety of gauges and widths, and as either cut lengths or coils. Widths up to

MOLDED IN FIBERGLASS

in choice of **COLORS** HAWS





HAWS Model 10Y: reinforced fiberglass plastic, heat laminated, vacuum molded. Concealed hanger and lag screws. For complete details see Haws Catalog in Sweet's Architectural File.

In fiberglass, in color . . . and a design as fresh as the latest architectural trends! HAWS Model 10Y brings welcome beauty and color appeal to school and institutional environments. It's vacuum molded in tough, lightweight, acid resisting fiberglass —with smooth lines and 100% concealed trim. HAWS vandal proof, shielded bubblers are anti-squirt, with HAWS Flow Controls. Choose from five decorator colors and white at no extra cost! Write for the complete specs on Model 10Y (and also Model 10X, the same fine design in enameled iron).

See HAWS Catalog in Sweets Architectural File for data on the entire Haws line.

HAWS DRINKING FAUCET COMPANY
1441 FOURTH STREET • BERKELEY 10, CALIFORNIA
Circle 158 for further information

products, equipment, materials

48". Technically there is no limit to pattern types. Any pattern that can be drawn on paper can be impressed into the steel. Pattern becomes part of metal and the design is limited only by the severity of the draw. A bonderized decorative enamel coating can also be applied.

AIA file no. 12-A-31
MFR: PITTSBURGH STEEL CO.

Circle 199 for further information

Fence pipe

MFR'S DESCRIPTION: Jones & Laughlin Steel Corp. announces the manufacture of a lightweight structural fence pipe, a tubular steel product used extensively in the fabrication of residential and other types of fencing.

USES: fences, railing, struts, awning frames, scaffolding, and racks, etc.

SPEC/FEATURES: tubular section approx. 20 per cent lighter than standard pipe. Available in either black or galvanized. Mill stock of all sizes in 21′ random lengths will be maintained by J&L. Sizes 1", 1¼", 1½" and 2". Standard over-all dimensional tolerances are applicable. Pipe furnished in single or double random lengths, plain end and square cut.

AIA file no. 14-K
MFR: JONES & LAUGHLIN STEEL CORP.

Circle 200 for further information

Hollow metal units

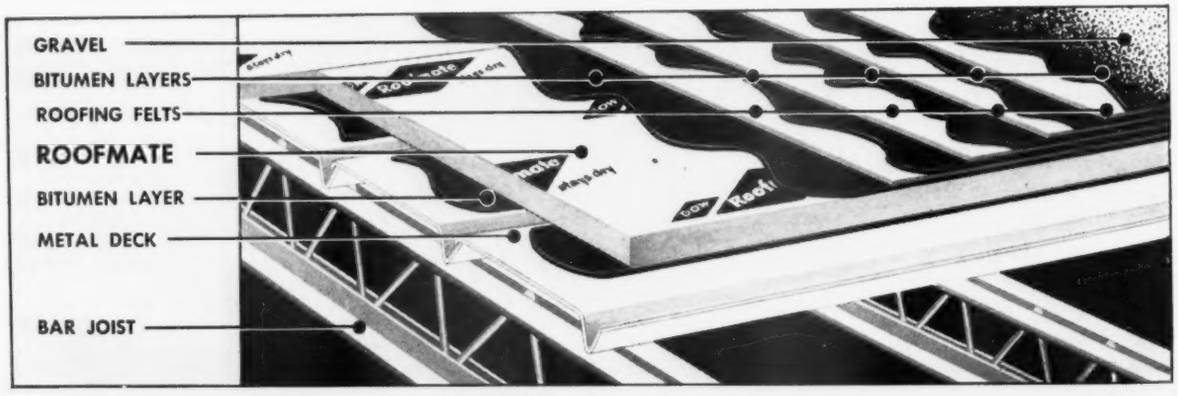
MFR'S DESCRIPTION: Aetna Steel Products Corp. announces a 48-hour distribution system for its new line of hollow metal components for borrowed lights, side lights, transoms, etc. This line supplements its "Aetnapak" line of in-stock door and door frame components.

USES: commercial and institutional buildings.

DOW | BUILDING PRODUCTS

Another building first from Dow . . .

ROOFMATE
TRADEMARK



new insulation for built-up roofs makes superior moisture barrier, reduces blistering and leaks!

This year heralds a major advance in roof insulation . . . a chemically engineered material that offers unsurpassed performance and lifelong service. Specially developed for built-up roofs, Roofmate* has all the beneficial properties of Styrofoam*, the insulation proved by a decade of industrial use.

SUPERIOR MOISTURE BARRIER. Millions of tiny cells of trapped air, each independent of the others, make Roofmate an impassable barrier to water and water vapor. This remarkable resistance to moisture gives Roofmate a *permanent* low rate of heat transfer, reduces vapor build-up, "blistering", and resulting roofing deterioration and leaks.

RUGGED STRENGTH, DURABILITY. Roofmate won't crumble, flake or deteriorate. It can accommodate the weight of workmen and normal roofing equipment with compressive strength to spare. Built-up roofs insulated with Roofmate do a better job and last much longer. Hot bitumens can be mopped directly over Roofmate without a protective covering.

NEW INSTALLATION ECONOMY. Roofmate is extremely lightweight, yet rigid and strong . . . easy to handle, cut and install. It's prefabricated in standard roofing sizes—2' x 4' in a wide range of thicknesses.

Specify Roofmate for your next built-up roof. For more information, contact the Dow sales office near you, or write to us. THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 1609JF4.

*STYROFOAM and ROOFMATE are trademarks of The Dow Chemical Company

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

Circle 159 for further information

SPECS/FEATURES: emphasis is placed on speedy delivery to site. Units designed for flexibility in use of variety of construction set-up with smallest possible number of components. Incorporated in assembly is a proprietary locking device. New catalog in preparation and available on request.

AIA file no. 16-H

MFR: AETNA STEEL PRODUCTS CORP.

Circle 201 for further information

ELECTRIC CONTROLS

Compact intercom

MFR'S DESCRIPTION: 20 intercom stations are available by means of compact, deck-top control cabinet used as master station of the "Type #11 Executive Quick Call."

USES: direct line interoffice phone communication.

SPECS/FEATURES: all switchroom relay equipment is connected to master station by a 30-conductor cable. Changing of pre-selected stations requires only a main frame jumper change. Measures: 5⅛" high x 5⅛" deep, x 12¼" over-all length. Cabinet housing is metal "wrap-around". Two rows of translucent pushbuttons located across cabinet face. Designation strip fits into holder between rows. No dialing involved. Equipment has system of controls for station activation. More engineering information available.

AIA file no 31-i-51

MFR: AUTOMATIC ELECTRIC CO.

Circle 202 for further information

Push-button station

MFR'S DESCRIPTION: a push button station with Neoprene housing, which features waterproof, non-corrosive, lightweight construction, has been announced

by Electric Products Div., Joy Manufacturing Co.

USES: hoist and crane operations, suspended locations and where pendant type control is necessary.

SPECS/FEATURES: available in three or four-button models. Two-piece housing weighs fraction of conventional metal unit, is about ⅓ of size, and specially grommeted to fit several cable sizes and assure weather tightness. Safety of material stressed. Each button integral with housing and completely enclosed for water and weather protection and protection from accidental lateral action. Interior roomy for wiring ease of precision switches.

AIA file no. 31-D-4

MFR: ELECTRICAL PRODUCTS DIV., JOY MANUFACTURING CO.

Circle 203 for further information

WINDOW UNITS

Aluminum units

MFR'S DESCRIPTION: an additional line of single and double hung aluminum windows (Series 158), adaptable to every type of construction, has been announced by the Truscon Div. of Republic Steel.

USES: in frame, masonry, veneer, concrete block or stucco construction.

SPECS/FEATURES: windows made adaptable by attachment of fins or anchors permitting conformity to regional building practices. Aluminum surfaces are etched and lacquered. Self-compensating spiral balances are enclosed in aluminum housing and have graduated spiral with a varying pitch. Constant spring tension throughout travel of vent contributes to effortless operation and ease of adjustment. Full perimeter wool pile weatherstripping for seal. The vertical stripping is aluminum backed wool pile; horizontal weatherstripping is wool pile and vinyl backed. Variety of design features complete assembly details: one-piece unit combination pull-down and strike, white bronze lock, friction points of nylon or silicone treated stripping, rattle eliminating nylon button spacers, staggered screw locations, removable parting strips, removable ventilators and adjustable mullions of screwless type.

AIA file no. 16-E

MFR: TRUSCON DIV., REPUBLIC STEEL

Circle 204 for further information

Shutter pass window

MFR'S DESCRIPTION: a packaged pass window for use between the kitchen and the dining room is offered by Cornell Iron Works, Inc.

USES: in school or other institutional dining facilities.

SPECS/FEATURES: factory assembled as a "ready-to-install" unit. Consists of a stainless steel frame combined with a 1¼" proprietary aluminum shutter which rolls up out of sight in a stainless steel enclosure under the head. A counter-balanced mechanism is incorporated to facilitate vertical travel of the shutter. The aluminum shutter is satin-finished and "Alumilited" for protection in maintenance. The shutter may also be specified in stainless steel to match frame and sill. Window unit may be furnished for any wall thickness and provided with masonry jamb anchors.

AIA file no. 35-C-3

MFR: CORNELL IRON WORKS, INC.

Circle 205 for further information

PANEL SYSTEMS

Movable partition system

MFR'S DESCRIPTION: a movable interior partition system designed for permanence which can be dismantled and relocated without damage to any of the parts is offered by Penn Metal Co., Inc.

USES: commercial, industrial and institutional buildings.

SPECS/FEATURES: designed around a single modular framing system to which can be attached a variety of paneling. Various panel types: steel with baked-enamel finishes in many colors; hardwood; unpainted plywood; and gypsum wallboard. Framing detail, the "Permalock" stud, has attachment groove into which vertical edges of panels are snapped. Studs are supported by adjusters that act as leveling devices to provide horizontal partition lines regardless of floor irregularities. Stud units also support bottom edges of panels and provide clip for metal base attachment. All parts of assembly, window frames, door headers and cornice are designed for easy erection. Partition thickness is 3". Hollow section of partition permits electric wiring passage and flexible outlet placement.

AIA file no. 35-H-6

MFR: PENN METAL CO., INC.

Circle 206 for further information

Vinyl-metal laminate

MFR'S DESCRIPTION: the "Arvinyl" wall paneling provides an economic system of vinyl-metal laminate units for a pre-finished wall.

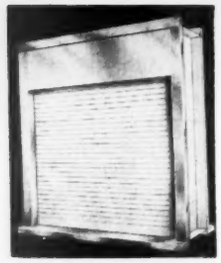
USES: interior wall finishes.

SPECS/FEATURES: simplicity of furring, preparation and installation emphasized by mfr, in addition to maintenance economy for use of "Arvinyl" wall system. Paneling consists of 12 mil. vinyl sheeting permanently bonded to 24 ga. steel formed with interlocking edges and backed with ½" rigid insulation board. Other properties stated by mfr are: (1) thermal conductivity: .327 BTU/hr/ft²/°F; (2) size: 16" and 24" wide by 8'-0", 10'-0" long; (3) weight: 1.8 lbs. per sq. ft.; (4) vapor barrier: foil or plastic. Other information in insulation, sound-deadening and fire-resisting properties available.

AIA file no. 23-L

MFR: ARVIN INDUSTRIES, INC.

Circle 207 for further information



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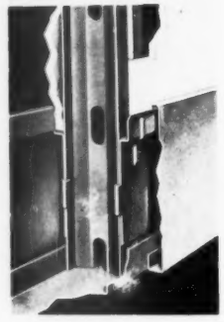


206

207

208

Wallpanel system

MFR'S DESCRIPTION: Masonite Corp.'s "Panelok" system is offered as a method of modernizing old walls and making them useful for display and storage.

USES: interior walls.

SPECS/FEATURES: the system consists of Masonite's hardboard panels 2′ wide and 8′ high, held vertically against steel splines which are barely visible between the joints and "Adjust-a-bilt" fixtures which fit into the splines to hold a variety of objects including desks, shelves, dressing counters, cabinets, magazine racks, closet storage items, etc. Panels come in four colors with random grooved and ungrooved patterns available. When applied to existing walls, "Panelok" system is fastened to 1″ x 2″ horizontal furring strips, 16″ o.c. The start is made at a corner or wall end by positioning a single wing lockstrip plumb and then fastening it with specially provided nails. The panel is slid onto the lockstrip. The next lockstrip is inserted into the panel, locating it 24″ from the first and a level is used to align the slots on the next lockstrip. It is fastened and subsequent panels are installed. Panels are 23⅞″ wide to fit loosely between the steel splines. Mfr provides instruction on applications.

AIA file no. 23-L

MFR: MASONITE CORP.

Circle 208 for further information

ELECTRICAL UNITS

Detachable unit

MFR'S DESCRIPTION: the "Quad-Easy-Tach" assembly is described as a terminal base and detachable reflector enabling the interchange or removal of reflectors whenever desirable.

USES: illumination needs.

SPECS/FEATURES: maintenance is simplified by having extra reflector lamp holder assembly and replacing it with "in-service" unit. By pushing pronged socket into cast hood, and a clockwise turn, instant mechanical and electrical connection is made. Mechanical

SOME THINGS YOU SHOULD KNOW ABOUT

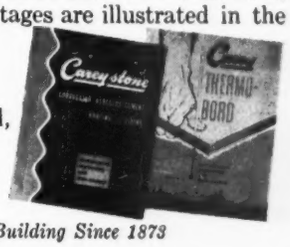
Carey® ASBESTOS-CEMENT CURTAIN-WALLS

Almost 30 years of experience in the manufacture of asbestos-cement panels for building enclosures has proved the superiority of Carey curtain-wall materials.

Architects specify these products because Carey asbestos-cement curtain-walls are so economical, so easy to install, and they are virtually maintenance-free. Furthermore, they are indestructible, being resistant to fire, hail, water, rust and rot.

There are three principal types of construction using Carey asbestos-cement curtain-wall products. Their advantages are illustrated in the detail sketches shown below.

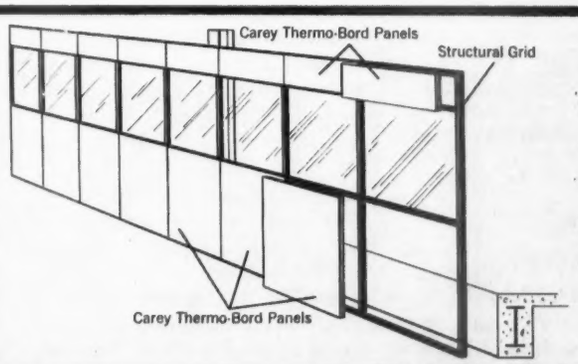
Write for architectural, engineering and data manuals.



The Philip Carey Mfg. Company • Lockland, Cincinnati 15, Ohio • Better Products For Building Since 1873

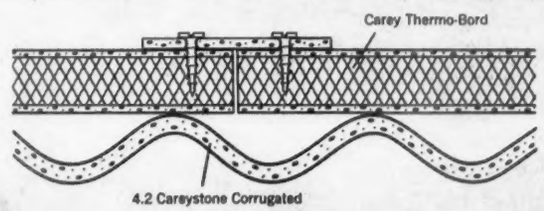
CAREYSTONE CORRUGATED WALL CONSTRUCTION

- can be installed with overlap joints or with battens
- needs no preservative surface treatment but can be painted any color
- does not require heavy framing or foundations
- ideal for simple structures where insulation is not required
- resistant to practically all atmospheric conditions existing in industrial areas



WINDOW-WALL CONSTRUCTION

- can be used with practically all types of window-wall designs
- used for schools, office buildings, commercial and industrial construction
- high insulation value
- deadens sound transmission through walls
- needs no surface finish but can be painted any color



THERMO-WALL CONSTRUCTION

- combines exterior and interior wall surfaces all in one
- has high insulating efficiency
- is quickly erected, requires no finishing
- can be used on all types of industrial buildings

Circle 160 for further information

design permits socket to make contact between electrical units of socket and reflector with balanced pressure. Switch-like action protects against arcing and relighting whenever servicing or interchanging reflectors is necessary. Available in nine standard designs. Units can be obtained with mogul or medium sockets.

AIA file no. 31-F-21
MFR: QUADRANGLE MANUFACTURING CO.

Circle 209 for further information

Downlight catch

MFR'S DESCRIPTION: a spring-actuated catch for the frames of downlights is described as permitting easier and safer servicing of light fixtures recessed in ceilings.

USES: recessed downlight units in ceiling construction.

SPECS/FEATURES: the "quarter-turn" catch requires a screwdriver pressure and turn. Conventional screws are replaced by device. Feature is standard on Simes downlight in 12" square sizes and is available in smaller sizes. Constructed as integral part of cast aluminum frame. Catch is assembled with stainless steel spring and a shank and slotted head of stainless steel. Spring assembly provides 3/16" clearance for ceilings that may be uneven. Further information on various applications available.

AIA file no. 31-F-23
MFR: THE SIMES CO.

Circle 210 for further information

Rigid conduit hub

MFR'S DESCRIPTION: a "cold-weld" seal is offered in a recently marketed two-piece "Uni-Seal" rigid conduit hub which is stated to eliminate expensive and time consuming welding.

USES: metal-to-metal seal in electrical work.

SPECS/FEATURES: mfr states that a 360°, uniformly centered, metal-to-metal seal is obtained by a patented wedge adapter that pulls up tight in the knock-out hole when the threaded hub is screwed down. This rigid-conduit hub "bites" into outer box wall metal to eliminate loosening through vibration, thus assuring a perfect ground. Adapter pulls down almost flush with inside box wall for more wiring room. Sizes: ½" to 4".

AIA file no 31-C-62
MFR: APPLETON ELECTRIC CO.

Circle 211 for further information

Utility unit

MFR'S DESCRIPTION: Benjamin Electric Manufacturing Co. has introduced a line of commercial fluorescent units designated as the B_2 utility line.

USES: primarily for economy lighting in retail stores.

SPECS/FEATURES: stated to be adaptable to a wide variety of commercial interiors with advantages of contemporary appearance, durability and lighting characteristics compatible with today's lighting standards. Unit is considered competitive in price with bare-lamp units and offers "extra" of polystyrene diffuser enclosure. Technical data and information available.

AIA file no. 31-F-21
MFR: BENJAMIN ELECTRIC MANUFACTURING CO.

Circle 212 for further information

WATERSTOPS

Plastic waterstops

MFR'S DESCRIPTION: W. R. Meadows announces improvements in its "Hydrojoint" extruded polyvinylchloride waterstop.

USES: as joint sealant in concrete construction.

SPECS/FEATURES: cross-section feature is multi-ribbed detail; center bulb designed to handle pressures caused by concrete movements. Specification reported by mfr: 2,250 psi tensile strength; 300 per cent ultimate elongation; 176° F to −50° F temperature range; −50° F cold brittleness test; chemically resistant to chlorinated water, salt water, acids, alkalies, sewage wastes, etc. Packaged in 50' coil lengths. Material flexibility permits corner bends or curve formation. Splicing on job requires application heat to melting and pressure to effect spline.

AIA file no. 7-C
MFR: W. R. MEADOWS, INC.

Circle 213 for further information

Rubber waterstop

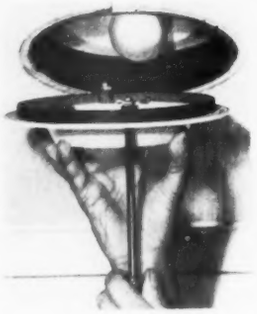
MFR'S DESCRIPTION: a rubber stop, "Aquastop," designed to provide absolute watertightness under hydrostatic pressure in concrete expansion, contraction and construction joints is announced by The Presstite-Keystone Engineering Products Co.

USES: modern concrete construction.

SPECS/FEATURES: engineered in material and design to withstand contraction, expansion and shearing movements. One 9" unit is said to withstand a 5" deformation created by lateral contraction or shearing action and to continue to provide absolute watertightness in the joint even under hydrostatic pressure. High tensile strength makes product distortion resistant during installation and its flexibility and elasticity virtually eliminates fatigue problems according to mfr. Manufactured in various grades of natural rubber, standard G.R.S. rubber and Neoprene. Available in standard sizes and shapes as well as a selection of molded accessories such as tees, ells, crosses and unions. Meets specifications of U.S. Army Corps of Engineers, Federal Highway agencies and other architectural agencies of state and Federal governments.

AIA file no. 7-C
MFR: THE PRESSTITE-KEYSTONE ENGINEERING PRODUCTS CO.

Circle 214 for further information



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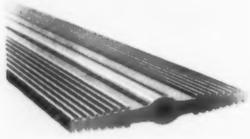

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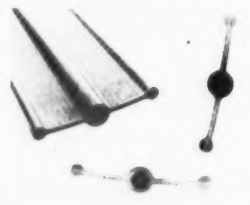

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THE ANATOMY OF A NEW PROJECT

preview: 4

PORTLAND EXPOSITION-RECREATION CENTER — *project*
THE CITY OF PORTLAND — *client*
SKIDMORE, OWINGS & MERRILL — *architects*
MOFFAT, NICHOL AND TAYLOR — *structural engineers*
J. DONALD KROEKER & ASSOCIATES — *mechanical engineers*
GRANT KELLEY & ASSOCIATES — *electrical engineers*

General description of program

The Portland, Oregon Exposition-Recreation Center is to be the largest multi-purpose facility of its kind in the expanding Pacific Northwest. Upon completion in late 1960, it will provide the most modern and complete facilities for conventions, meetings, sports events, pageants, shows and many other activities. A spectacular structure, the multi-purpose Arena embraces a whole new concept in arena design. The project also includes an Exhibition Hall, Meeting and Assembly facilities, War Memorial and Court, and on-site parking for 1,900 cars.

General features

The Exposition-Recreation Center is located on the east bank of the Willamette River on the edge of downtown Portland. Existing and proposed freeways in the immediate future provide excellent access to and egress from all sections of the city.

The 360-foot square glass curtain wall encloses a 330-foot diameter concrete seating bowl. The entire 360-foot square roof structure is carried on four massive concrete piers, maintaining a complete separation from the seating bowl and obstructing no lines of spectator vision.

One large curtain, encircling the entire circumference of the bowl, will close mechanically when performances within so require. At night, the illuminated arena building will command an impressive view of the downtown area across the river and will be seen from many points in the city, as well as from the major highways and rail lines.

The Exhibition Hall is recessed into the slope of the site to permit roof-top parking. Upon approaching the Center, the visitor will see the curved entrance pavilion with the main Arena Building directly in the background. He will then pass by the Memorial Court which is located immediately next to and below the entrance plaza. The visitor next moves into the Arena Building vestibule, through ticket control turnstiles, and into the main concourse that surrounds the mid-base of the seating form. From the concourse, many vomitories lead the visitor into the large arena bowl.

Plan elements

A brief description of the three principal building elements is as follows:

1. *Multi-purpose Arena:* The Arena Building is designed for every type of event requiring large seating capacities. The 120-foot by 248-foot arena floor will be provided with an underfloor freezing system so that hockey and recreational skating can be held. The height from the arena floor to the suspended acoustical ceiling is 80 feet. A total of 8,500 theater-type permanent seats are to be installed with portable riser arena floor seating provided to reach a capacity of over 13,000 for boxing matches.

Service functions, including team rooms, mechanical and storage facilities, staging areas, and kitchen and commissary, are located at Arena Floor. Concession stands and toilets are liberally placed at Arena Floor and Concourse levels. A total of 18,000 square feet is provided at the Concourse Level for permanent exhibitions.

2. *Meeting and Assembly Facilities:* Nine meeting rooms with a total capacity of 2,700 persons are provided. Individual capacities vary from 100 to 1,100 persons. Sub-dividing partitions are planned so that various size requirements can be met. Catering kitchen facilities will permit their use for banquets as well as for meetings of all kinds. Meeting rooms are located directly off the lower parking level and will be accessible without conflicting in any way with crowds attending other events.

3. *Exhibition Hall:* The Exhibition Hall totals 52,650 square feet and is capable of accommodating 295 booths, each 10-feet by 10-feet. Storage areas, concessions, exhibitors' offices and restrooms are immediately adjacent and connect to the Exhibition Hall. Entrances to the Exhibition Hall are planned so that the facility can be used jointly or separately with the Arena. Utility connections are frequent within the area for gas, compressed air, hot and cold water, drains, telephones, television, and public address system. The Exhibition Hall has direct access to the meeting and assembly facilities.

Multi-Purpose Arena Building of the Portland Exposition-Recreation Center. (Rendering: Rudolph Associates)

Special features

Arena Curtain: From the top edge of the 330-foot diameter seating bowl to the suspended perforated aluminum ceiling, a varying distance from 15 to 31 feet, a single curtain mechanically operated, rises to enclose the Arena. This is primarily for matinee performances requiring complete artificial lighting effects. The curtain is a "sandwich" fabricated with two outside layers of flame-resistant fibrous glass fabric with an acoustical center of 2-pound density, one-inch thick of fibrous glass. Lift lines at approximately 10-foot centers rise to and through the ceiling and are brought to the lift assembly by alignment outriggers fanning throughout the entire roof structure space. At the press of a button, the entire enclosing curtain will rise from the top rim of the seating form to the suspended ceiling.

Arena Exterior Glazed Curtain Wall: Nearly 80,000 square feet of glazed curtain wall provides the exterior enclosure of the 360-foot square Arena Building. This curtain wall basic unit is 3'-6" by 9'-0", framed with anodized aluminum. A 3/16" glare reducing grey glass is used for all panels, excluding the lowest 9-foot band that is glazed with 1/4" grey sheet.

Structural information

Foundations: The foundations for the Arena Building consist of 24- and 30-inch diameter reinforced concrete belled caissons. The caissons are founded on a semi-cemented gravel stratum 25 to 30 feet below the Arena floor level with a maximum soil pressure of 16,000 pounds per square foot. Lateral loads on the caissons are resisted by the passive resistance of the earth.

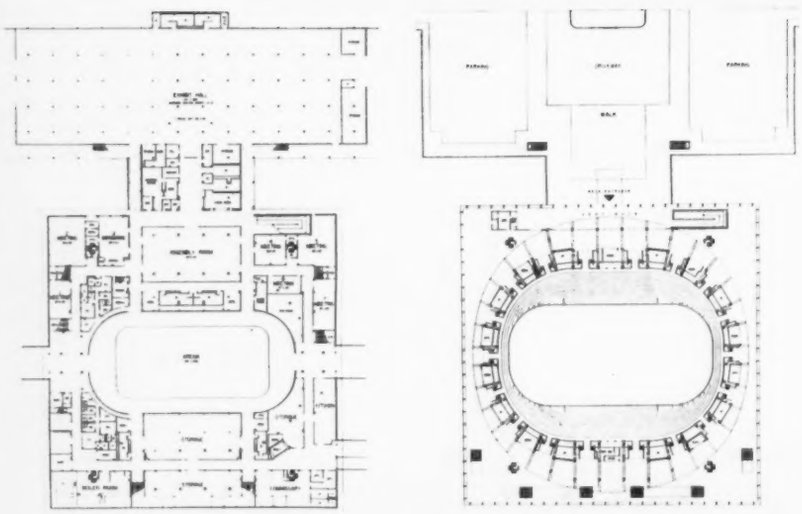
Floor framing: The concourse floor framing consists of conventional reinforced concrete joists and beams on reinforced concrete columns. The floor is designed for 100 pounds per square foot or a concentrated load of 10,000 pounds. The seat deck bowl consists of precast conventionally reinforced concrete seat deck units on poured-in-place reinforced concrete frames.

Roof structure: The 360-foot square roof structure is supported on four reinforced concrete piers whose spread footings rest on the cemented gravel stratum previously mentioned. The piers are in the shape of a cross 12 feet out-to-out with the projections of the cross being 5 feet wide. Lateral roof loads are transmitted to the foundation material through the piers as 100-foot cantilevers off their foundations. The four piers are 270 feet on center in one direction and 240 feet apart in the other direction, locating them outside the seat deck structure to give an unobstructed view from any point.

The roof structure consists of three sets of steel trusses utilizing A-242 low alloy steel in many places, steel joists and a steel roof deck with vermiculite fill concrete.

The roof deck served as a monolithic diaphragm for the complete roof to transmit lateral wind load from the exterior curtain walls through the truss system to the reinforced concrete piers.

(*Continued on next page*)



(Top left), assembly rooms and Arena level. (Top right), roof-top parking, Memorial and Court and Arena Building proper. (Bottom), perspective showing roof-top parking arrangement atop Exhibition Hall connected to building in background. (Rendering: Rudolph Associates)

Exhibition Hall framing: The Exhibition Hall is a single story reinforced concrete building. The roof serves as a parking deck which is designated for AASHO/H-10 loading. The roof structure consists of precast, prestressed concrete channel units spanning 30 feet to poured-in-place conventional reinforced concrete beams supported on reinforced concrete columns at 30 feet on center. The foundations of this building consist of spread footings with soil pressures and footing loads carefully balanced across the width of the building to prevent differential settlement. This building is unique in that one long side is exposed to earth for its full height of 20 feet. The earth pressure is resisted by the ground floor slab diaphragm. The diaphragm loads are resisted by shear walls which in turn are prevented from sliding by their friction against the earth. In order to obtain adequate friction resistance to sliding, many spread footings were strutted together.

Mechanical system

The central plan consists of steam boilers, water chilling units, deep well and pump, heat exchangers, and heating and cooling water distribution systems.

The steam boilers are of the automatically-fired, low-pressure type and provide heat for the building and domestic hot water.

The water chilling units are hermetic, centrifugal type and provide capacity for the ice rink and meeting rooms. When ice is not being maintained, the unused refrigerant capacity is automatically available for cooling of the arena and exhibition areas.

The heat exchangers automatically provide heating by steam, pre-cooling by well water, and cooling by chilling unit to the numerous air handling systems.

The ice rink consists of 1¼-inch steel pipe imbedded in the floor slab on 4-inch centers, with an ethylene glycol solution as the freezing medium.

All public areas of the building are air conditioned. Each area can be operated individually, and the room temperatures are maintained individually.

Electrical system

Supply/distribution: Two primary energy sources are brought to the building at 11,000 volts from two separate substations by the serving utility. An automatic transfer switch will almost immediately transfer the building load to the standby primary source upon failure of the normal source. Two separate vaults are provided, one to supply the Arena Building, the other to supply the Exhibit Hall. Basic utilization voltage is 120/208 volts, three-phase, four wire. Large power loads are supplied from separate power company transformers in the arena vault at 277/480 volts, three-phase, four-wire, which is also used for the large area fluorescent lighing in the Exhibit Hall.

Exhibit Hall lighting: Exhibit Hall lighting is fluorescent with high output lamps in industrial type reflectors, supplied at 277/480 volts. Exhibit area power will be derived from an overhead power bus duct system with bus runs 45 feet on center. Bus ducts provide 120/208 volt energy for single or three-phase needs, with a total capacity of 1,600 amperes supplied to the area.

A system of overhead expanded metal trays provides for the installation and removal or re-arrangement of telephones, signal, public address, television coax and similar low tension facilities for exhibitors. The tray system parallels the power bus system.

Arena Building house lighting: Arena Building lighting is essentially all incandescent. The main arena house lighting utilizes reflector type lamps up to the 1,000-watt RB-52, mounted in flush, top service type fixtures. House light control is from the arena lighting console, switched in groups to permit various uses and arrangements of the house and seating. Provisions for future dimmers to replace the house lighting contractors are incorporated.

Arena theatrical lighting: The main Arena lighting utilizes approximately 210, 1,000-watt, theatrical type floodlight units, all controlled from the lighting console installed in the arena seating form. Control is through dimmers and a switch type interconnection panel. Arena floods are mounted on a catwalk system above the ceiling line, located just beyond the outside edges of the arena floor to provide frontal lighting of the performers and players on the floor. The light beam angle is steep enough to avoid bothersome glare to spectators on the opposite side of the arena seating. Each flood is equipped with a color frame. Additional console controlled outlets are located along the catwalk system to provide for special effects, additional lighting and supplementary loads. Groups of narrow beam spotlights are positioned at four sides of the boxing ring on the catwalk system to provide semi-permanent ring lighting, with the beam angles set to provide frontal lighting for ring performers.

Blocks of power, up to 800 amperes, three-phase, are available at four locations around the arena floor for portable stage use and other arena portable power requirements.

TV/sound facilities: Telephone and broadcast facilities are provided throughout, including the meeting and conference rooms. Provisions for closed circuit projection television extend to the meeting rooms and can be carried to the Exhibit Hall. Provisions are incorporated for public address sound for sound re-enforcement, paging and music. Sound input circuits permit multiple use for local microphones, radio broadcast use, sound power interphones or low level intercommunication and cueing systems.

Costs

Construction contract:	$5,396,000.00
Total gross floor area:	341,300.00 sf
Total gross volume:	13,340,700.00 cf
Cost per square foot:	$15.80
Cost per cubic foot:	$ .40

literature

Literature cited in this department is available from various manufacturers and associations free of charge. To obtain copies, circle the keyed numbers on the reader service cards facing pages 12 and 36.

Dramatic presentation

The new EJS Lighting Corp.'s catalog is now in its third printing due to the demand for copies. Designed for architects and engineers, it presents in four sections (residential, architectural and special design, bullets, and portables) information on lighting fixtures in five-color illustrations. The dramatic presentation was designed by Marvin Grayson and Gerald Simon. (72 pp.)

AIA file no. 31-F

MFR: EJS LIGHTING CORP.

Circle 50

Color portfolio

Wall colors reflecting current tastes and trends in home furnishings are compiled in a "professional color portfolio" developed by the Martin-Senour Co. The colors are arranged in seven categories according to groups of hues, accents, exterior and interior colors.

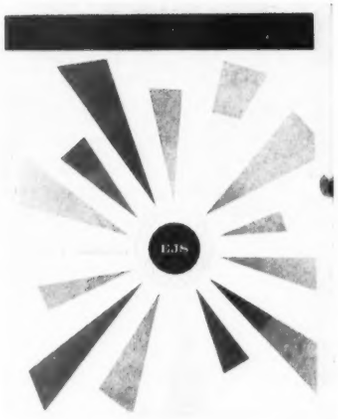
AIA file no. 25-A-2

MFR: MARTIN-SENOUR CO.

Circle 51

Non-ferrous components

The Julius Blum & Co.'s new 1959 bulletin, "Stock Components for the Fabrication and Assembly of Nonferrous Hand Railings," is offered. This comprehensive presentation of railing materials provides a ready reference to available components. Covering aluminum, bronze, stainless steel and plastic components, it offers detail drawings and specifications. Two sections are devoted to the recently introduced "Carlstadt Railing System" and to "Colorail." The former system is designed around a novel adjustable handrail bracket with special emphasis placed on design simplicity, durability and economy. The section given to "Colorail," a color-fast plastic handrail molding, includes installation instructions. Design detailing data, including information on fittings, moldings, bars, shapes, tubing and ornamental components is included. (24 pp.)



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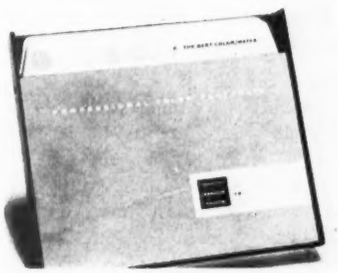

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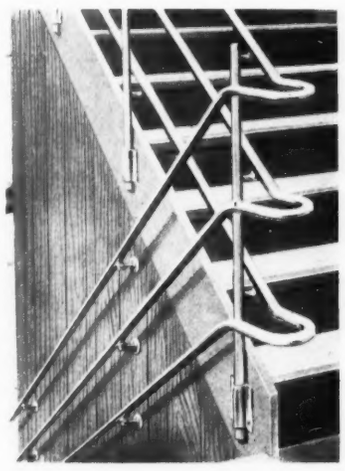


52

AIA file no. 14-D-4

MFR: JULIUS BLUM & CO., INC.

Circle 52

Facilities survey

An institutional statement on the research and development facilities and products offered by North American Aviation, Inc. has been released. The firm is a fabricator of architectural metal assemblies for the curtain wall industry. The literature emphasizes the scope of its program, which includes evaluation of the strength and resistance to environment of various metals, test and development of curtain wall sealants, and development program for finishes and plating processes. (8 pp. and 6 pp.)

AIA file no. 15-L

MFR: NORTH AMERICAN AVIATION, INC.

Circle 53

Architectural metals

A handsome institutional publication on the use of copper, brass and bronze in contemporary architecture is offered by American Brass Co. Titled "Architectural Metals by Anaconda," this comprehensive publication is illustrated in full color and may well function as an intelligent reference to the users of copper and copper alloys in current architectural design. Available metals, their compositions, colors, forms, physical properties and architectural applications are discussed. Instructions for obtaining various finishes and for economical maintenance, with detailed specifications, are included. Twenty-eight examples of significant architectural work are given in full color together with fabricator's shop drawing details. Presentation covers: the architectural selection and design of copper and its alloys; component detailing and fabricating techniques; finishes, color and surface treatments; problems of maintenance; and suggested specifications. (64 pp.)

AIA file no. 15-B

MFR: THE AMERICAN BRASS CO.

Circle 54

STRUCTURAL ELEMENTS

Floor system

The 1959 catalog of H. H. Robertson Co. describes its "Q-Air Floor," a proprietary system incorporating structural, electrical, air conditioning, sub-floor and other construction features. A series of isometric views, photographs, and sections illustrate the essential components of the system. Various architectural considerations for integrating construction details, fireproofing, thermal insulation, mechanical, electrical, and structural requirements are presented and discussed. Dimensions, tables of properties and suggested specifications are included. (28 pp.)

AIA file no. 30-A

MFR: H. H. ROBERTSON CO.

Circle 55

Grandstands

Reinforced-precast concrete grandstands are described in the release of Monroe Seating Co. A sheet of specifications gives live and dead load capacities, seat lumber requirements, steel qualities, foundation characteristics and properties, and design and planning features including access and exits, guard railings, and pitch of tier rise. (1 p.)

AIA file no. 4

MFR: MONROE SEATING CO.

Circle 56

Steel joists

Macomber steel joists, which incorporate the mfr's cold-rolled steel V-section chords, are described in

literature

current literature. Macomber steel joists are open-web structural framing members designed in accordance with the specifications of the Steel Joist Institute. The "Cold-Rollformed V-Section" top and bottom chords are a patented feature incorporated in a Warren-type web system of tubes and round bars welded to the chords at evenly spaced 2' interior panel joints. Top and bottom chords are nailable. Dimensions, properties and allowable total loading tables are given in addition to isometric illustrations for a variety of framing details and construction connections. (8 pp.)

AIA file no. 13-G

MFR: MACOMBER

Circle 57

Wood research

The Wood Research Laboratory of Virginia Polytechnic Institute has released two studies: King-Post Nailed Trussed Rafters (bulletin #36); and Nailing of Plywood Sheathing with "Hi-Load" Nails (bulletin #35). These studies were conducted by E. George Stern, Research Professor, and have received industry sponsorship. The study on the King-Post rafters is the result of almost two years of research and describes in detail what is believed to be the most economical roof construction developed to date. The reports are carefully documented, illustrated and contain performance data. Illustrated is the King-Post nailed trussed rafter. (#36, 24 pp. and #35, 16 pp.)

AIA file no. 19

LAB: WOOD RESEARCH LAB, VIRGINIA POLYTECHNIC INSTITUTE

Circle 58

SCHOOL USES

Science facilities

A brochure published by Scientific Apparatus Makers Assn in cooperation with the School Facilities Council presents a guide for evaluating science facilities in today's school plants. Of interest to planners of schools because consideration of space areas, cabinets and other built-in equipment generally falls within the responsibility of the architect. A master check list of facilities for the major requirements of secondary school science rooms is given. (16 pp.)

AIA file no. 35-B

ASSN: SCIENTIFIC APPARATUS MAKERS ASSN.

Circle 59

School furniture

This 1959 booklet issued by the American Seating Co. and compiled in cooperation with the School Facilities Council undertakes the study of school seating today. Topics covered in a non-proprietary discussion are the essentials for best teaching performance, seating postures, work surfaces, an appraisal of basic seating designs, special purpose seating, seating construction and factors in evaluating costs of furniture. Limitations as well as advantages are discussed. (16 pp.)

AIA file no. 35-B-3

MFR: AMERICAN SEATING CO.

Circle 60

Wallcoverings in schools

A brochure suggesting uses of vinyl wallcovering fabrics is offered by L. E. Carpenter & Co. as an aid to planning practical, as well as attractive school interiors. Various applications in auditoria, gymnasium, corridors, classrooms, etc., are illustrated. Economy, durability, and maintenance ease of product are stressed. (8 pp.)

AIA file no. 28-C

MFR: L. E. CARPENTER & CO.

Circle 61

HARDWARE

Door closers

Sargent & Co. has announced the addition of a new door closer section to its general catalog which features rectangular style closers and includes all material on the standard type. It replaces the current door closer section. Information on selection and specification of closers, technical details, and illustrations are included. (40 pp.)

Form no. 40V-10-58

AIA file no. 27-B

MFR: SARGENT & CO.

Circle 62

Hydraulic hinges

"The Closet Closer" is the title of an illustrated brochure offered by Bakewell Products which illustrates its Hydro-Hinge line of precision hydraulic door control hinges. Advantages are cited and users named. Details and specifications given for two series types—heavy traffic interior, and lightweight interior doors. (4 pp.)

AIA file no. 27-B

MFR: BAKEWELL PRODUCTS

Circle 63

CERAMIC TILES

Large tiles/mosaics

The 1959 catalog of Romany Spartan ceramic tile is available describing a complete line of glazed and unglazed ceramic floor and wall tile. Large tile units and ceramic mosaics are illustrated through color chip charts and full color photographs of developed projects. Special tile, such as conductive ceramic mosaic, is included. Graphic schedules of tile sizes are given together with suggested specifications. (26 pp.)

AIA file no. 23-A-2

MFR: UNITED STATES CERAMIC TILE CO. AND THE SPARTA CERAMIC CO.

Circle 64

Tile workbook

The 1959 Mosaic ceramic tile "Workbook for Architects" is available. It introduces a large fold-out sheet and charts on the mfr's 149 tile colors in the "Harmonitone palette." The workbook is in full color and covers the wide ground of completed installations, glossary of tile terms, decorative and special uses of tiles, accessories, shapes, specifications and distribution services. (40 pp.)

AIA file no. 23-A

MFR: THE MOSAIC TILE CO.

Circle 65

INSULATION

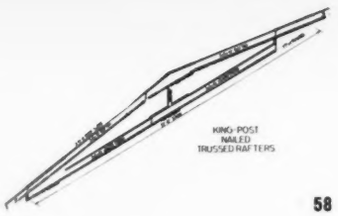
Building insulation

A brochure describing and illustrating Fiberglas building insulation has been released by Owens-Corning Fiberglas Corp. Information is given about the company's variety of building insulation products. Information and sketches illustrating areas for residential applications are included. (8 pp.)

AIA file no. 37-C

MFR: OWENS-CORNING FIBERGLAS CORP.

Circle 66



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Piping insulation

This 1959 brochure of Pittsburgh Corning illustrates, tabulates and comprehensively describes the uses of Foamglas, a cellular glass insulation for industrial piping and equipment, and Foamsil, a 99 per cent pure silica glass, formed as an acid-proof high temperature insulating refractory material. The physical and thermal properties, recommended thicknesses of application for a variety of piping processes, and accessory materials are given. (12 pp.)

AIA file no. 37-B

MFR: PITTSBURGH CORNING CORP.

Circle 67

Spun mineral fibers

Comfort and its control in light construction is discussed in literature issued by Johns-Manville describing the uses of Spintex, a spun mineral fiber insulation. Characteristics, thermal conductance data, methods of application or various conditions, and means of material control are included. (12 pp.)

AIA file no. 37-C

MFR: JOHNS-MANVILLE

Circle 68

Blanket insulation

Balsam-Wool insulation products for frame and masonry construction are described in current literature offered by Wood Conversion Co. Details of installation, specifications for a variety of applications and several blanket types of insulation available are given. (4 pp.)

AIA file no. 37-C-1

MFR: WOOD CONVERSION CO.

Circle 69

Monolithic insulation

Specification and application data for "All-weather Crete" lightweight roof insulation are contained in new bulletin. "All-weather Crete" is a thermoplastic-bound volcanic glass produced by franchisees and applied by licensed applicators. Applied hot in a monolithic, water-free layer, it may be installed under adverse weather conditions. Detailed drawings show typical installation techniques for contoured roof decks, flat roof decks and promenade and parking decks. Other uses for product such as floor slab insulation, cavity wall insulation, cold storage insulation and underground pipe insulation are also discussed. Included is specification sheet for use when specifying product for roof deck insulation.

AIA file no. 37-C-2

MFR: MINING AND MINERAL PRODUCTS DIV., GREAT LAKES CARBON CORP.

Circle 70

Cellular glass

Cellular glass insulation produced as Foamglas by Pittsburgh Corning for roofs, parking decks, core walls, wall linings, curtain walls, and for perimeters and ceilings is described in new literature offering. Application procedures, insulation details and accessories are comprehensively given by photographs, diagrams, sectional views, and charts of technical data. (20 pp.)

AIA file no. 37-B

MFR: PITTSBURGH CORNING CORP.

Circle 71

Structural board

Nu-Wood structural insulation board products are described in current literature. Materials and methods of application as well as specifications are given for sheathing, roof insulation, shingle backing and roof deckings. (4 pp.)

AIA file no. 37-B

MFR: WOOD CONVERSION CO.

Circle 72

PLASTICS

Translucent panels

"Sanpan" structural building panels which offer translucency with a range of color skins and color inserts for design, function and architectural appearance are described in literature issued by Panel Structures, Inc. Uses as curtain wall, exterior and interior wall components, roof panels and skylights are stated and design properties, dimensions, physical composition, bonding, and colors are also included. Suggested installation details and specifications given. (6 pp.)

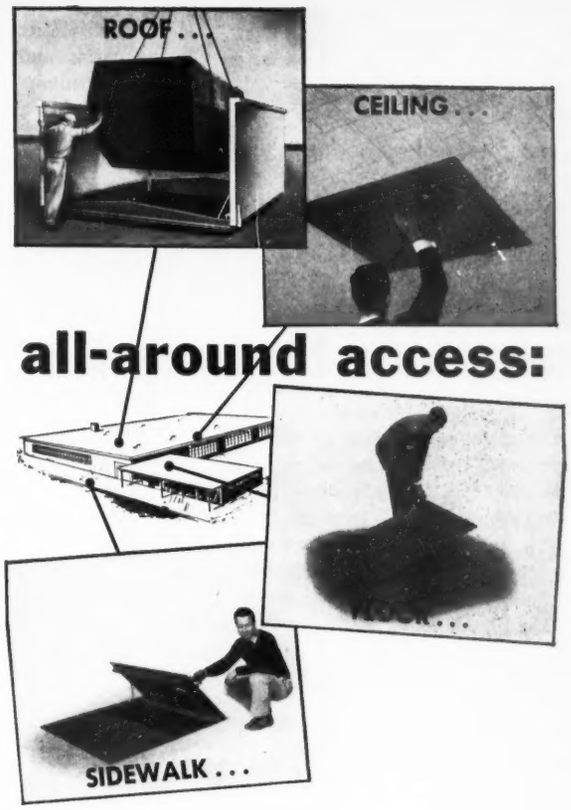
AIA file no. 17-A

MFR: PANEL STRUCTURES, INC.

Circle 73

Acrylic in architecture

The uses of acrylic plastic in architecture are given in recent literature issued by Rohm & Haas Co. describing its product, Plexiglas. The information presented is directed to the archi-



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Circle 161 for further information

literature

tectural problems of utilizing Plexiglas. Physical characteristics, standard building product and custom designed applications, types of sheets, structural strengths, and flame-resistant properties are outlined for various uses: lighting fixtures, luminous ceilings, window glazing, domical skylights, louver panels, signs, store front facades, illuminated signs and display letters. The brochure discusses Plexiglas as a basic component and presents information required for its proper specification, design and assembly. (16 pp.)

AIA file no. 24

MFR: ROHM & HAAS CO.

Circle 74

CERAMIC UNITS

Double-surfaced tile

The "Uniwall" facing tile for single unit wall construction, integrally finished with special interior and exterior surfaces, is described in current literature issued by the Natco Corp. Shape details, construction details, design data, laboratory test findings, unit specifications and job specifications are included in the description of the "double duty" load-bearing clay facing tile. (12 pp.)

AIA file no. 10-B

MFR: NATCO CORP.

Circle 75

Four types

Heavy duty decorative floor brick, "frostproof" glazed quarry tile, large unit veneer and basic quarry tile are four unit types described in current literature of Summitville Tiles, Inc. Color chips, trim units for each type and illustrated uses are given. (8 pp.)

AIA file no. 23-A

MFR: SUMMITVILLE TILES, INC.

Circle 76

Solar screens

Current literature issued by the Federal Seaboard Terra Cotta Corp. describes and illustrates a series of ceramic veneered structural clay units designed to be combined into decorative grilles or screens for contemporary architectural use. A series of geometric and specially designed shapes are illustrated individually and as ensemble pattern arrangements. Dimensions, contruction data and color samples available. (4 pp.)

AIA file no. 10-B

MFR: FEDERAL SEABOARD TERRA COTTA CORP.

Circle 77

WINDOWS/DOORS

Window units

The Warren Webster & Co.'s "Newport" air conditioner units, for individual room or wall-enclosed installation, are described in recent literature. Cabinet construction, controls, filters, refrigerant cycles, installation, unit ratings, piping diagrams, and construction details are discussed. (12 pp.)

AIA file no. 30-F-1 and 2

MFR: WARREN WEBSTER & CO.

Circle 78

Tracing details

An interesting and functional file folio of individual sheets which can be traced or printed on Reynolds Metal Co.'s #500 series of commercial projected aluminum windows is available. This series of windows is designed for commercial, institutional, industrial and apartment use. Material presents only essential information concisely and with visual clarity. Filing size (9" x 11½" with projecting reference tab), this folio appears to be a useful and refreshing innovation in descriptive product literature. It may serve as a drafting tool for sketch-detail study for working drawing development. (13 sheets printed on tracing paper)

AIA file no. 16-E

MFR: REYNOLDS METALS CO.

Circle 79

Steel doors/frames

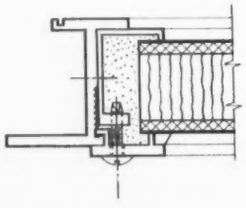
A technical and descriptive catalog on steel doors and frames is offered by Amweld Building Products Div. on its lines for heavy duty, high frequency application in standard types and sizes. Drawings, photographs and lists describe the variety and styles of models for use in commercial, institutional and residential applications. Suggested architects specifications are provided. Inserted in the catalog is a sheet listing Underwriters' Laboratories "A" and "B" label fire doors and frames, now available in a broad range of types and sizes. (20 pp.)

AIA file no. 16-B

MFR: AMWELD BUILDING PRODUCTS DIV., AMERICAN WELDING & MFG. CO.

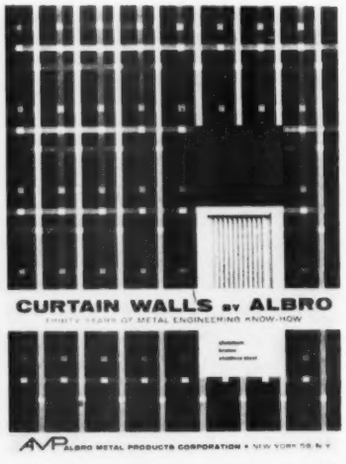
Circle 80

77



INSULATED PANEL INSTALLATION

79



83

CURTAIN WALLS

Mosaic curtain unit

Literature illustrating completed projects in color describes the uses of Macotta curtain walls surfaced with Mosaic ceramic tile. Descriptions of exterior facings, core sandwich constructions, interior facing, periphery molding and sizes are given together with installation details and suggested specifications. (4 pp.)

AIA file no. 17-A

MFR: MAUL MACOTTA CORP.

Circle 81

Aluminum units

The 1959 catalog of Valley Metal Products Co.'s aluminum curtain wall series is offered. Catalog contains photos of completed projects and is illustrated with sections, elevations and details of various curtain wall assemblies. (12 pp.)

AIA file no. 16-E

MFR: VALLEY PRODUCTS CO.

Circle 82

Three basic series

Three basic series of curtain wall systems for all building types are described in Albro Metal Products Corp.'s new catalog. The adaptability of these curtain wall systems for a variety of architectural treatments is illustrated by photographs of significant architectural projects. Typical sections for large flat panels designed for enclosure of medium and high-rise structures, light commercial grids for multi-story buildings, and a structural aluminum grid for low-rise buildings are given. Suggested architectural specifications included. (12 pp.)

AIA file no. 17-A

MFR: ALBRO METAL PRODUCTS CORP.

Circle 83

Tracing folio

Complete drawings and specifications for Reynolds Metals Co.'s "Economy Wall System 101" are supplied in an interesting and functional file folio of individual sheets which can be

traced or printed. This curtain wall system for one and two-story buildings, provides windows and panel sections in single units, eliminating labor otherwise necessary to assemble various parts. The folio's slip-sheets give only essential information concisely and with visual clarity. Filing size (9″ x 11½″ with a projecting reference tab), the folio appears to be a useful and refreshing innovation in descriptive product literature. It may serve as a drafting tool for sketch-detail study and for working drawing development. (14 sheets on tracing paper)

AIA file no. 17-A

MFR: REYNOLDS METALS CO.

Circle 84

Two-hour fire rating

A specification has been developed by Pittsburgh Corning Corp. for curtain wall panels with a two-hour fire rating. In developing the specifications, consideration was given to panel thickness, proper materials and cost. The PC research lab test indicated a rating slightly over two hours may be obtained by constructing a laminated panel of the following materials: steel; 3″ Foamglas insulation; ⅝″ Firestop Bestwall Board; and steel. Tests were conducted on a 36″ x 36″ panel in accordance with ASTM procedure.

AIA file no. 17-A

MFR: PITTSBURGH CORNING CORP.

Circle 85

Ceramic faced panels

The "RS" ceramic tile faced, insulated panels for curtain wall design are illustrated, described and detailed in literature issued by Ceramic Tile Panels, Inc. Insulated concrete panels cast monolithically with ceramic tile facings, insulated metal sandwich panels with ceramic facing, edge conditions, detailed and research information on ceramic tile, colors and suggested specifications are included. (10 pp).

AIA file no. 17-A

MFR: CERAMIC TILE PANELS, INC., SUBS. OF U.S. CERAMIC TILE CO.

Circle 86

Panels/windows

Aluminum windows, curtain and panel walls illustrated by typical architectural project uses for a variety of building types, have been covered in a brochure issued by Artex Div. of Arnold Altex Aluminum Co. Sectional views, construction details and short forms and general specifications are included. (28 pp.)

AIA file no. 17-A

MFR: ARTEX DIV., ARNOLD ALTEX ALUMINUM CO.

Circle 87

CONTROL SYSTEMS

Clock/program systems

Literature describing clock and program systems featuring "memory tape" control is available from Standard Electric Time Co. Master clock and program controllers, secondary clock, program signals, bell control boards and TWX systems and necessary accessories are comprehensively illustrated, diagrammed, and detailed for surface and recessed mounting. Specification suggestions also included. (20 pp.)

AIA file no. 31-i-24

MFR: THE STANDARD ELECTRIC TIME CO.

Circle 88

Remote controls

Remote lighting control systems are described in current literature issued by Century Lighting. The systems are stated as making it possible for one man with a full view of the performance area to have complete control of the intensity, color, form and movement of all light during every movement of a production. Based on electronic devices designed for flexibility, compactness and reliability, the units are custom assembled in any of an unlimited number of sizes and capacities to meet the needs from the largest opera house to the smallest school stage. Two main modular elements are used: control console and dimmer, and bank. Literature printed on heavy coated stock and prepunched for ring binder filing. Visual clarity and conciseness of information presented. (4 pp.)

AIA file no. 31-F-33

MFR: CENTURY LIGHTING, INC.

Circle 89

Fire control

This 1959 bulletin issued by Honeywell discusses the needs for automatic detection, alarm, location, sprinkler and notification in providing protection against delays in fighting building construction fires. The discussion, drawn from various laboratory and safety bureaus concerned with fire protection, introduces Honeywell's automatic detector alarm locater-panel control system, and alarm-supplement system for sprinkler control. (12 pp.)

AIA file no. 31-i-31

MFR: HONEYWELL

Circle 90

Vandal alarm

Engineering and architectural specifications are given for the Bogen Model MCR "Vandal Alarm System," a centralized sound surveillance system designed to detect the presence of intruders in any one of a group of closed buildings. The system may be used as an accessory switching circuit for those schools which have existing centralized sound systems. (4 pp.)

AIA file no. 31-i-3

MFR: BOGEN-PRESTO, DIV. OF THE SIEGLER CORP.

Circle 91

Time controls

New catalog issued by Tork Time Controls provides section on switching and timing. To aid selection of right switch action, typical wiring diagrams and explanations of "what switches what" are provided. A simple formula for the selection of the proper timing is offered. (8 pp.)

AIA file no. 31-i-24

MFR: TORK TIME CONTROLS, INC.

Circle 92

In-out register systems

Equipment and system data sheets for "Staff In-and-Out Registers" are described in current literature issued by S. H. Couch Co., Inc. Units provide an arrangement of lamp-illuminated name tiles for use in institutions and business organizations where it is desirable to know whether individual staff members are on or off the premises. Combinations can be made to accommodate 400 names despite compactness of unit. Utilizes 3,000 hr. lamps. Surface and flush mounted units are described and tabulated for control, recording and recall registers. Construction details, wiring diagrams, finishes and mechanical specifications also included. (10 pp.)

AIA file no. 31-i-41

MFR: S. H. COUCH CO., INC.

Circle 93

ROOFING

Five roof textures

Five textures for roof applications are illustrated and explained in the new brochure of the Red Cedar Shingle Bureau, "Distinctive Roof Applications." The brochure emphasizes the creative use-possibilities due to the natural character inherent in red cedar shingles and to the reasonable economy enabling architectural texture in residential design. Houses pictured have ocean wave, dutch weave, serrated, thatch and pyramid designs, but the booklet stresses the infinite textural varieties possible — the limitations being those of the ingenuity of the designer. Simplest type to install is serrated roof. Explanation is offered for its desirability in emphasizing horizontal character of contemporary residences. Every fifth and sixth course of shingles is doubled, adding extra-heavy shadow lines and a compositional rhythm to the roof. (6 pp.)

AIA file no. 19-D-1

MFR: RED CEDAR SHINGLE BUREAU

Circle 94

Seamless roofing

The 1959 catalog of Follansbee Steel Corp. describes its seamless terne roofing. Terne, as a traditional material which is an alloy of lead and tin, has had historic architectural uses in this country. Present headquarters of the AIA in Washington still has a terne roof which replaced the structure's original roof in 1870. Mfr's terne is described as offering greater resistance to deterioration because product is now made of copper-bearing strip steel and has a heavier lead-tin alloy coating. The literature describes the advantages of appearance, design versatility, permanency, and low maintenance. A comparison of weights, expansion and tensile strength with other materials is made. Specifications, details, and weathersealing information is included. (8 pp.)

AIA file no. 12-A-31

MFR: FOLLANSBEE STEEL CORP.

Circle 95

CHIMNEYS/VENTS

Metal gas vents

The 1959 Van-Packer metal gas vent catalog gives comprehensive information on the architectural require-

literature

ments for the use of this specially designed metal pipe for venting all gas-heating appliances. Construction features, typical installations, selection tables, lengths of run, shapes, dimensions, fittings, and specifications are concisely stated, detailed and illustrated. (16 pp)

AIA file no. 30-D-4
MFR: VAN-PACKER CO.

Circle 96

Factory unit

The Huncilman series #100 "7 in. Class A all fuel chimney" is described in literature of the national distributors, The Philip Carey Mfg. Co. Light weight, installation ease, various housing details, fabrication and assembly features are cited as advantages of this product. U.L., FHA and VA approval listed for this residential "packaging" chimney. Current price list included. (4 pp.)

AIA file no. 14-E
MFR: BERT R. HUNCILMAN AND SON; DISTRIBUTOR, THE PHILIP CAREY MFG. CO.

Circle 97

Pre-fab chimney

Literature describing the Van-Packer factory-built masonry chimney cites its U.L. approved use and major building code acceptance for all home heating plants and incinerators. Flue sections consist of 2,100° F 5/8" fire clay tile lining, 3" vermiculite concrete insulating wall, and cement asbestos jacket. Quick installation, low cost, design freedom, durability, permanency and appearance are cited as advantages by mfr. Comparative draft and flue-gas temperature test data and other installation, specification and detailing information are included. (8 pp.)

AIA file no. 5H
MFR: VAN-PACKER CO.

Circle 98

OFFICE AIDS

Microfilm system

An illustrated folder describes the features and accessories of K&E's Micro-Master 105 mm photo reproduction system for engineering drawings. The Micro-Master system, according to mfr, reproduces almost any size drawing, restores smudged or worn originals to legibility, guarantees "distortion-free" accuracy, and produces permanent negatives of "archival quality" for economical establishment of a storage file. Concept as a totally integrated system for photographing, film processing and final reproduction or projection printing is given. (4 pp.)

Folder 25883-5M

AIA file no. 35-H-31
MFR: KEUFFEL & ESSER CO.

Circle 99

Symbol chart

A wall chart, 17" x 22", of electronic and communications equipment symbols is offered by Dukane Corp. This guide is based on IRE, NEMA, and MIL standards and covers sound distribution, paging, private telephone, intercom, nurses' call, and equipment symbols.

AIA file no. 31-R
MFR: DUKANE CORP.

Circle 100

HVAC

Horizontal heat pumps

Lennox Industries offers literature describing its heat pump units utilizing only air and electricity. The discussion covers compressors, coil units, expansion valves, defrost controls, and demonstrates operation and installation through cut-away views and diagrammatic layouts of various applications. Tables of equipment requirements, dimensions, pressures, and capacities included. (6 pp.)

AIA file no. 30-C-5
MFR: LENNOX INDUSTRIES, INC.

Circle 101

HVAC specs

A single sheet bulletin containing sample specifications for heavy duty, direct fired, forced air heaters has been issued by Reznor Manufacturing Co. The firm states that its specification suggestion is based on 70 years of specialized heating experience. Equipment, capacities, approvals, construction, location, controls and warranty are elements of the specification. Engineering data, a cut-away section and capacity ratings are given on the reverse side for a heavy duty, direct-fired forced air heater unit. (2 pp.)

AIA file no. 30-B-1
MFR: REZNOR MANUFACTURING CO.

Circle 102

Water cooling towers

Current literature of the Marley Co. offers information on its line of "Double-Flow Aquatowers," a series of water cooling towers available with either wood or steel structure capable of installation with concrete, wood or steel cold water basins. Various models give a wide range of performance capacities. Mfr stresses design and engineered use of materials are directed to compatibility with contemporary architectural structures. (4 pp.)

AIA file no. 30-F-3
MFR: THE MARLEY CO.

Circle 103

Finned-tube units

Vulcan Radiator Co.'s current literature describes the finned-tube "Linovector" enclosures and covers for use in schools, hospitals, offices and institutional buildings. Engineering information, ratings, selection factors, pressures, pipe selection and layouts, hanger and connectors are described. The comprehensive material includes suggested specifications. (32 pp.)

AIA file no. 30-C-4
MFR: VULCAN RADIATOR CO.

Circle 104

High velocity systems

The Anemostat "Dual Duct High Velocity Air Distribution System" for heating and ventilating schools is discussed in recent literature. High velocity units with various controls, micro-pressure regulators, blender values and other accessories are described and illustrated through photographs, classroom layout-schemes, distribution flow-diagrams, performance data charts, sectional views and cabinet and diffuser accessory uses. (16 pp.)

AIA file no. 30-F-1
MFR: ANEMOSTAT CORPORATION OF AMERICA

Circle 105

Motorless diffuser

"Pneumafoil" is described in Connor Engineering Corp's literature as a high velocity air valve which eliminates air motors and mechanical linkage while retaining positive operation by a 15 psi pneumatic control system. Actuating force is directly proportional to valve size. Each hollow vane of the air diffuser contains a sealed neoprene actuator connected to control air. As air pressure increases, actuators inflate and the vanes expand thereby constricting the open area and throttling air flow. Air capacities, controls, mixing units are also described. (2 pp.)

AIA file no. 30-J
MFR: CONNOR ENGINEERING CORP.

Circle 106

NON-FERROUS METALS

Heavy press extrusions

A brochure covering the design and production of heavy aluminum extrusions has been prepared by Harvey Aluminum. Featured is a review devoted to designing for heavy press extrusions including types of sections producible and standard manufacturing limits for solid shapes, hollow shapes, panels, and tube. Practices and procedures for quality control, and die design and die making also are described. Some of the special aluminum shapes being designed with big extrusions include column and spandrel covers for curtain wall systems, sections for shell structures, modular forms for concrete floors and walls, temporary expanding beams, and cooling tower blades. Conventional structural shapes such as I-beams, H-beams, channels, angles, tees, zees, etc., also are being extruded by Harvey in sizes comparable to the largest fabricated steel sections. (16 pp.)

AIA file no. 15-J
MFR: HARVEY ALUMINUM

Circle 107

Aluminum

Aluminum in architecture is the subject of a new Kaiser Aluminum booklet which lists aluminum architectural availabilities, characteristics and suggested applications. Included is a description of the advantages of aluminum in architectural applications and properties of aluminum requiring design consideration. Information is listed in tabular form for ease of reference and comparison. Also illustrated with photographs, section drawings and typical details. One of the tables is a guide to selection of allovs

for given applications. Another provides technical information and properties of the available architectural alloys helpful in considering structural stresses. A chart comparing technical information on architectural aluminum finishes serves as guide to specifying finish treatments. Among products described are standard and specialty sheet products; architectural extrusions, including copings and gravel stops, thresholds, window sills, facing system, handrails, architectural and structural shapes, rod, bar, pipe and tube; stressed-skin domes; screening and electrical conductors. (24 pp.)

AIA file no. 15-J

MFR: KAISER ALUMINUM & CHEMICAL SALES, INC.
Circle 108

Mill products

An aluminum mill products brochure giving complete specifications for the hundreds of alloys and forms of aluminum is available from Reynolds Metals Co. The brochure pinpoints specific properties and suggests methods of applications. Included are alloy and temper designations, fatigue and shearing strengths, and various alloys available in foil, sheet and plate, wire, rod and bar, tubing and pipe, and extruded and structural shapes. Fabricating and finishing techniques are summarized. A bibliographic guide to related literature and movies is included. (18 pp.)

AIA file no. 15-J

MFR: REYNOLDS METALS CO.
Circle 109

Bridge railings

A printed folder containing complete drawings and specifications on aluminum bridge railings and accessories has been released by Reynolds Metals Co. Of special interest to architects, the 26 separate drawings are printed on tracing paper for convenient use by tracing or machine printing. (26 pp.)

AIA file no 14-D-4

MFR: REYNOLDS METALS CO.
Circle 110

Exhibit cases

The 1959 catalog issued by Michaels Art Bronze Co. describes its current production of exhibit cases in a variety of types: recessed, table, aisle and wall. Available with bronze or aluminum frames and constructed to accommodate cork, grooved or specialized backboard materials. Detailed with accessory bracket shelf supports and fluorescent light reflector units. Units may be used singly or in continuous runs with mullion dividers and diaphragms. Photographs, construction details, and suggested specifications included. (4 pp.)

MFR: THE MICHAELS ART BRONZE CO.
Circle 111

ELECTRICAL UNITS

Passenger conveyor

The "Speedwalk" and "Speedramp" passenger conveyor systems are described in current literature as designed to provide high-capacity, mass transportation for people in congested areas such as rail, bus and air terminals, shopping centers, parking lots, sports arenas, race tracks, over and under street crossings, etc. The "Speedwalk" system is a specialized form of belt conveyor. The "Speedramp" is similar except that these conveyors carry people up or down inclines up to an inclination of 15°. Belt structural supports, dimensions, installation details, construction and machine details are illustrated and described in addition to safety features and necessary component parts. (12 pp.)

AIA file no. 33-J

MFR: STEPHENS-ADAMSON MFG. CO.
Circle 112

Low voltage protector

Bulletin issued by General Electric provides detailed information on the application, features and operation of GE's type LB-1 power protector designed for heavy duty commercial building applications, 480 v. AC and below. Contains photos, tables, charts, curves, guide form specifications, dimensions and ratings. (8 pp.)

AIA file no. 31-i-43

MFR: GENERAL ELECTRIC
Circle 113

Telephone/power system

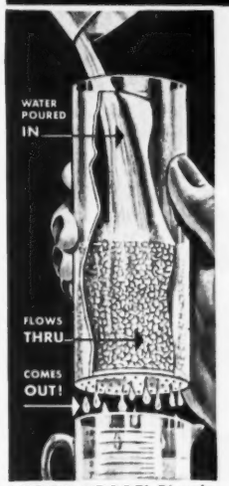
An illustrated booklet describing a method of installing communications and power wiring, each in its own surface raceway channel, is offered by Wiremold Co. Called the "Tele-Power System," the assembly consists of a pair of parallel raceways—one for telephone, signal and inter-office communications wiring; the other a multi-outlet system for power and light service. The system is installed on the surface of the wall, making the wiring easily accessible. Two systems are de-

ZONOLITE®

Announces

A NEW KIND OF INSULATION

FOR MASONRY WALLS!



HERE'S PROOF! Simple test reveals how new Zonolite repels water penetration.

Actually SHEDS WATER

Revolutionary new and completely different, Zonolite Masonry Fill Insulation brings you the faster, easier, lower-cost way to insulate concrete block, tile, and cavity walls. A triumph of laboratory and technical research, it is processed under U.S. Patent 2,824,022 to stop water penetration like no other insulation can. Now puts an end to the bug-a-boo of moisture problems in all types of block and cavity wall construction.

Cuts Heat Transfer up to 50% in block and cavity walls

Filling blocks or cavities is easy. Sometimes, a simple hopper is used to facilitate installation.

Walls filled with this new material have up to twice the insulating value. Greater comfort results; fuel bills are reduced; air conditioning costs cut—*substantially.*

Saves Time, Money

Easily installed. Flows freely into cores and cavities around reinforcing and other obstructions. No fitting, cutting, measuring. Beats other installation costs by as much as 60%.

WHICH OF THESE TYPES OF PROJECTS ARE YOU WORKING ON NOW?

CHECK THIS LIST ☐ homes ☐ motels ☐ shopping centers ☐ schools ☐ churches ☐ industrial plants ☐ farm buildings ☐ cold storage jobs

Zonolite Masonry Fill is the perfect insulation for concrete block, tile or cavity wall construction.

MAIL COUPON FOR FULL DETAILS

ZONOLITE COMPANY Dept. AEN-49
135 S. LaSalle Street, Chicago 3, Ill.

Please send me complete information file (G-158) on Zonolite Masonry Fill Insulation.

*Name*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

Circle 162 for further information

literature

scribed in detail together with the necessary fittings. Photographs of actual installations are included and recommended specifications.

AIA file no. 31-C-6

MFR: THE WIREMOLD CO.
Circle 114

Crystal lens

A foldout mailer containing a sample of Crystopal Pattern 71, a commercial lighting glass, is available from Corning Glass Works. The low brightness lens panel, a water white crystal with opal added, was developed to provide uniform, brightness-controlled illumination in stores, offices, hospitals, and public buildings. Includes a brief description of the lens panel and an illustration of a typical installation.

AIA file no. 31-F-2

MFR: CORNING GLASS WORKS
Circle 115

Low brightness lens

An illustrated bulletin on the new commercial lighting glass, Crystopal #71, has been issued by Corning Glass Works. The lens panel of water white crystal with opal added was developed to provide uniform, brightness-controlled illumination in stores, offices, schools, hospitals and public buildings. Suggested specifications, tables for calculating illumination levels and photometric data are included. Charts, graphs, and drawings describe testing conditions, brightness and distribution data and coefficients of utilization for two, three and four-lamp troffers. (6 pp.)

AIA file no. 31-F-237

MFR: CORNING GLASS WORKS
Circle 116

Floodlights

Crouse-Hinds Co. offers its new floodlight catalog. It has been designed for ease of selection of appropriate floodlights for specific conditions. Presented in heavy three-ring binder with durable plastic cover, the catalog has colored divider sheets as indexing device. Each divider sheet has its individual table of contents. New listings and prices are included. New sections added are: "How to select floodlights," Mercury vapor floodlights," "Hazardous area lighting," and "Floodlight poles." An excellent and well defined reference source to mfr's products. (107 pp. in 13 sections) Floodlight catalog #320

AIA file no. 31-F-22

MFR: CROUSE-HINDS CO.
Circle 117

MISCELLANEY

Marble maintenance

The cleaning and maintenance of marble is discussed in a carefully prepared manual of the Marble Institute of America, Inc. The cleaning of various interior and exterior marbles, use of the poultice method, and the removal of organic, metallic and oil-grease stains are covered. Methods of finishing and miscellaneous suggestions for weatherproofing and other protection are also included. This manual provides a useful reference tool for the architect in rendering maintenance advice or specification preparation. Illustrated. (16 pp.)

AIA file no. 22-A

ASSN: MARBLE INSTITUTE OF AMERICA, INC.
Circle 118

Glass block uses

This 1959 literature from Pittsburgh Corning describes, illustrates in color photographs, and graphs physical performance data and design details for the use of the PC line of glass blocks. The entire range of 12 colors, six decorative patterns and three functional blocks are included. Suggested architectural specifications included. (8 pp.)

AIA file no. 10-F

MFR: PITTSBURGH CORNING CORP.
Circle 119

Flooring listings

The 1959 list of the Maple Flooring Manufacturers Assn. gives the laboratory tested and approved floor finishing products available. All products listed have been examined under revised specifications, supplementing specifications of three years ago. The information includes both the penetrating sealer and epoxy type floor finishing products. The sealers are recommended for finishing hardwood floors in residences, school classrooms and gymnasiums, ballrooms, stores, bakeries, textile mills and industrial plants. Other types recommended for light traffic duty areas. (4 pp.)

AIA file no. 25-G

ASSN: MAPLE FLOORING MANUFACTURERS
Circle 120

Partition finishes

Richards - Wilcox Manufacturing Co.'s 1959 catalog presents architectural data on facing materials for folding partitions and moveable walls. The brochure is interesting in that it contains actual swatches of the company's products: vinyl fabric coverings, aluminum panels, woods, and duck canvas facings. (4 pp.)

AIA file no. 35-H-6

MFR: RICHARDS-WILCOX MFG. CO.
Circle 121

Product line

Leigh Building Products has issued its latest condensed catalog of metal building products for residential, commercial and industrial uses. Products included are: bi-folding doors, sliding door hardware, closet hardware, shelving and rack accessories, kitchen conveniences, awnings and canopies, mail boxes, hoods, ventilators and grilles. Price list included. (30 pp.)

AIA file no. 14

MFR: LEIGH BUILDING PRODUCTS
Circle 122

Construction handbook

The 1959 Horn Construction Data Handbook has been released. Created for the architect and engineer, the pocket size book devotes over 40 pages to tables and charts for estimating building material requirements. Also included are mensuration tables, construction details and authentic data on painting and concrete work. A. C. Horn products for protection, preservation and decoration of concrete, metal and wood are described. (160pp.)

AIA file no. 1-C

MFR: A. C. HORN COS.
Circle 123

FOLDING UNITS/DOORS

Folding wardrobes

Classroom folding wardrobes are covered in recent brochure of Brunswick-Balke-Collender Co. Wardrobes available in three types: receding, pivoting, and folding, in multiple or pair operation for all types. Details and specifications given. (4 pp.)

AIA file no. 35-B-4

MFR: THE HORN DIV., BRUNSWICK-BALKE-COLLENDER CO.
Circle 124

Wood folding doors

The 1959 Pella catalog describes series of wood folding doors available in pine, oak, mahogany, birch, walnut or ash. Size charts, extended, stacked, or recessed applications and details are included as well as specifications. (8 pp.)

AIA file no. 16-M

MFR: ROLSCREEN CO.
Circle 125

Current line

"Modernfold" folding doors are described in recent literature. Three lines, the "Crown-master," "Woodmaster," and "Spacemaster" are illustrated and diagrammed. Available sizes, construction features and dimensions are given. (6 pp.)

AIA file no. 16-M

MFR: MODERNFOLD DOORS
Circle 126

Bi-fold doors

"Paniflex" bi-fold doors, with panels of ¾" Novoply, are described in recent brochure of U. S. Plywood as capable of giving an uninterrupted floor-to-ceiling effect without the use of a header. Installation and fabrication procedures, assembly details, a hardware schedule, suggested specifications and a warranty statement are included. (10 pp.)

AIA file no. 16-M

MFR: UNITED STATES PLYWOOD CORP.
Circle 127

Folding louver

Consolidated General Products, Inc. offers its catalog describing the "Louver-Fold" door, which, by a system of adjustable vertical louvers, functions as a folding door or room divider or as a louvered partition in the partially open position. Full range of woods, sizes, colors, stock and custom models are described in addition to the inclusion of specifications and installation details for residential, commercial and institutional applications. (10 pp.)

AIA file no. 16-M

MFR: CONSOLIDATED GENERAL PRODUCTS, INC.
Circle 128

books

HERE OF ALL PLACES *by Osbert Lancaster. Boston: Houghton Mifflin Co., 1958. 189 pp. and 81 full-page satirical drawings by the author. $4.00*

Reviewed by:
*John James Carlos**

Here Of All Places is described, on its dust jacket, as a "brief and much-too-frivolous" history of architecture from Stonehenge to Manhattan. It is indeed, a deft, swift and merciless satire on the beloved Mother of the Arts.

This latest work of the noted English author and cartoonist, Osbert Lancaster, provides a delightfully inventive view of architecture that "is completely imaginary and no reference is intended to any actual building living or dead." The author's stated objective is to do for architecture and its buildings what the Audubon Society has done for birds—that is to classify buildings so that the average passer-by may spot, place and identify a *bit* of architecture (no matter what its inspired origins) with the same enthusiasm a keen birdwatcher has on spotting a red-breasted flycatcher.

Underlying this grotesquely comic account of architecture from the "Earliest, Earlier, Early" to the "Coca-Colonial" periods, is an informed, urbane and beautifully concealed serious educational intent—a literary technique of which the English writers appear to be past-masters.

Like a master magician, Lancaster never lets his audience down by revealing the mechanics of the legerdemain, but delivers his wit with a rapier-like thrust and with deadly graphic accuracy.

He stabs at the *mystique* that has befogged architecture of late and rescues the subject for the ordinary reader. One doesn't have to understand the quantum theory, Hindemith madrigals or be a confirmed lotus eater to enjoy architecture, which in Lancaster's words, "is always with us; we sit in it, work in it and pass by whole chunks of it every day."

In the last century, John Ruskin's

**Who doubles in brass as editor and has been known, on occasion, to read a good book.*

(Continued on page 45)

cedar fans freshness into home design

Favorable first impressions are assured when you combine fresh design with quality merchandise. Certigroove cedar shakes give you the best of both. The deep-etched striations add interest to a wall and mask joints between shakes. Double-coursing with shakes creates bold shadow accents for home exteriors as well as superior insulation in all kinds of weather.

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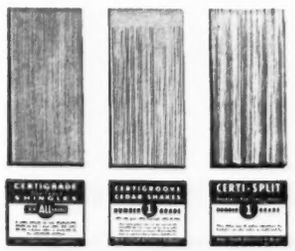

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abstracts

Highest reflection

Excerpted comment by Leonard J. Currie, Head of Architectural Department, Virginia Polytechnic Institute, from recent Inter-American Symposium sponsored by Owens-Corning Fiberglas Corp.

". . . Architectural expression, like all the arts, at the present time, is in a feverish-ferment of change. All the world is breathless with the dizzy pace of scientific and technological change, but most of the public is unaware that the arts often anticipate science in the adding of new dimensions and new concepts to human understanding. To the lone architect it might appear that virtually the entire architectural profession has embraced what might broadly be called modern architecture, and that differences and conflicts between subtleties of functionalism, organic architecture, constructivism, regional expression . . . and all the rest are of little more importance than a tempest in a teapot.

"However passions run high within the profession, especially among men . . . who are concerned with architecture as an art and as the highest reflection of society. . . .

"Not long ago we cast off the academic fetters of traditional architecture with its classical orders and tis tired eclectism. . . .

"Our architecture came forth clean, functional and simple. But it soon proved not so simple. It has since taken several differing paths and to architects these are vital matters to be fiercely contested. . . .

"We seek constructive means to harness these many creative energies into shaping a more harmonious and satisfying human environment . . . [by] ways in which the new concepts and new techniques might be married, blended, or interwoven with the cultures and traditions of various localities, to develop an architecture at once at peace with 20th Century technology and with our cultural heritage. . . ."

Aesthetics in construction

From a talk by Paul Rudolph, Chairman of Architectural School, Yale University. Delivered on 13-city closed circuit television informational meeting for architects, presented by the Structural Clay Products Industry, February 24, 1959.

"Every sliver of wood, every rolled wide flange beam, every slab of glass, every cube of concrete and every brickbat has its own unique potential. In a gifted architect's hands these materials are the means to great art. The 20th Century is rich not only in new materials but new adaptations of the old. The prolific barrage from the manufacturers is overwhelming sometimes. . . .

"For instance, a recently completed shopping center outside Boston had, at last count, no less than 62 separate materials on its exterior alone. This is a far cry from Boston's Beacon Hill where a single material, brick, has been used to unify several residential blocks, creating one of the most beautiful series of streets, squares and sequences of space to be found in the whole of the United States. Beacon Hill is never dull and great variety has been achieved. . . . Walking through Beacon Hill, one's eye is caught by a brick arch or lintel, then a molded brick cap or coping. But always there is a feeling of serenity, security and unity.

"There are two lessons to be learned from Beacon Hill. First, it is always the whole which is important, never the individual part, and secondly, great variety can be achieved by very simple means.

"However, Beacon Hill is a product of a bygone day. The dramatic population upswing, the economic, political and social changes whetted by the spirit of the times [have] given us new problems. Increased population and a new scale given by the automobile give us a new dimension. Skeleton frames of steel and concrete are used for multi-story buildings and lightweight infilling walls are natural companions. Glass and composite sheet materials of many kinds are appropriate thirty stories above the sidewalk but not necessarily at ground level. The lower the building, the greater the number of choices. In this sense, architectural design becomes much more difficult for one story buildings than for multi-storied ones. . . .

"This is in no way a plea to return to the old; we must find our own answers suitable for the 20th Century. However, pattern making for the sake of patterns never results in anything except the banal. . . .

"The architect's task is perhaps more difficult than ever before because it is possible to do almost anything. He must search for the innermost potentiality of every material and use it to make a meaningful whole."

Ultimate building costs

From a talk by General Otto L. Nelson, Jr., Vice President in Charge of Housing, New York Life Insurance Co. Delivered on 13-city closed circuit television informational meeting for architects, presented by the Structural Clay Products Industry, February 24, 1959.

"Ultimate building costs—this is indeed an intriguing subject that invites speculation in many areas of design, construction, and operation of buildings. . . .

"In this day of rapidly increasing costs our first task has had to be a vigorous effort to reduce first costs. However, we have been very conscious sometimes, perhaps too conscious, of the long term maintenance and depreciation costs. I probably should admit that initial financing has not been a problem. This may have helped me to reach the strong conviction that first costs are but a minor part of the total or ultimate cost picture. Initial cost is in reality only the down payment.

"In the examination of total costs that are susceptible to precise dollar figures there should be no excuse in not going through a vigorous analysis in which—other things being equal—you seek a combination of first costs, annual maintenance and operation costs, and obsolescence costs which, when appropriately combined, give you the lowest optimum ultimate costs. . . .

"However, one must admit that it is the imponderables [of beauty, style, design innovations, etc.] that are so very perplexing. We know, for example, that the ultimate cost of windows is several times greater than for an opaque wall. Heating, air conditioning and cleaning costs on windows are very high indeed. Yet a windowless apartment is not rentable. How then does one provide a proper balance? We have varied the ratio of window to wall area considerably in our several housing projects, but we are by no means sure that we know what the optimum ratio should be. It occurs to me that here is a golden opportunity for some basic and objective research for the building industry to undertake. It involves psychology, physiology, technology and economics. These are some of the imponderables which may be susceptible to reduction.

"Similarly, when we strive for appearance effects and beauty, the judgments called for are difficult. But I would assert strongly that appearance and beauty are important; they must not be treated as worthy of consideration only when they do not cost any more. I would go even further and say that when you are fortunate in achieving the element of appearance and beauty which you had in mind, the additional cost is well worth the price. . . .

"These elements must be considered in building investment—engineering, aesthetics and economics. Sound investment can result only by a proper balance of these three factors. To place too much emphasis on any one or to neglect any one, is to invite architectural and financial failure."

(Continued from page 43)

Seven Lamps of Architecture pleaded the cause of functionalism and rationalism. In 1959, Lancaster provides gentle, loving laughter. That too, is part of the maturing strength and the historic indestructibility of a great art.

Plastics

Vinyl Resins, *by W. Mayo Smith. New York: Reinhold Publishing Corp., 1958. 282 pp., illus. $5.75.*

Covers scope of vinyls, types and properties, chemistry, manufacture and fabrication, applications and new developments.

Structural design

Plastic Design of Steel Frames *by Lynn S. Beedle. New York: John Wiley and Sons, Inc., 1958. 406 pp., 263 illus. $13.00.*

Professor Beedle is Research Professor of Civil Engineering of the Department of Civil Engineering at Lehigh University. Book treats principles and methods in plastic design of steel, connections, design methods and offers an appendix and references.

Reinforced Concrete Fundamentals with Emphasis on Ultimate Strength *by Phil M. Ferguson. New York: John Wiley and Sons, Inc., 1958. 604 pp., illus. $9.50.*

Structural theory

Theory of Beams *by T. Iwinski, translated by E. P. Bernat. New York: Pergamon Press, Inc., 1958. 83 pp., illus. $3.50.*

Theory of Beams is first part of a major project on the application of the Laplace Transformation method to static problems in theory of structures and deals with beams on two and more supports under various conditions of loading. This monograph discusses the application of the Laplace Transformation method to the solution of the ordinary differential equations which occur in the theory of beams.

Surveying

The Principles and Practice of Surveying, *Vol. I: Elementary Surveying, Ninth edition. Revised with the assistance of Alexander J. Bone. New York: John Wiley & Sons, Inc., 1958. 717 pp., illus. $6.50.*

Over-all revision of previous edition published in 1945. Book has been expanded and brought up to date. Useful both as a textbook and as a handbook for field use.

films

A School for Johnny *produced by the American Institute of Architects. Available on rental of $5.00. Sound, 16 mm., color, running time: 14 min.*

Useful as a visual tool for architects in speaking to parent-teacher groups, school boards, and citizens committees. Deals with specific local school construction problems.

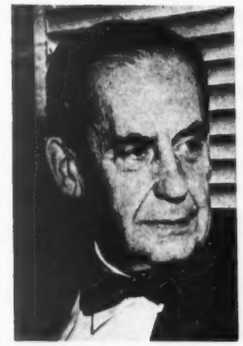
Space for Learning *produced by Erven Jourdan of Los Angeles for Service Library, California Redwood Assn., 576 Sacramento St., San Francisco, Calif. Available on free loan. Sound, 16 mm., color, running time: 15 min.*

Shows how school architect must understand the mind of the child and the mind of the community to achieve his aim in the creation of new schools.

A Product of the Imagination *produced by Wilding Picture Productions for Alcoa. Available on loan from Motion Picture Section, Aluminum Company of America, 1501 Alcoa Building, Pittsburgh 19, Pa. Sound, 16 mm. or 35 mm., color, running time: 26 min.*

Elaborate documentary with an original musical score by Lloyd Norlin depicts the history of aluminum from the mine to the finished product as the camera reviews the industry's past, present, and future in terms of processes, plants and products.

names



WALTER GROPIUS, FAIA

One of America's most distinguished and illustrious architects, the world-famous Harvard University professor emeritus, Walter Gropius, FAIA, has been named winner of the 1959 Gold Medal of the American Institute of Architects.

The esteemed architect-educator will receive the coveted award in the course of the annual AIA convention at New Orleans, June 22 to 26.

Gropius was born in Berlin, Germany, in 1883. He received his architectural education in Berlin and Munich and entered private practice in 1910. At the end of the first world war and until 1928, he was the first director of the famed Bauhaus School of Applied Arts at Weimar and later at Dessau, Germany. The aim of the Bauhaus was, in Gropius' words, to "solve the creative problems of industrialization."

Countless artists and architects were attracted to the Bauhaus, the influence of which on visual design—"from the coffee cup to city planning"—became world wide. Gropius' own fame as one of the pioneers of contemporary architecture began with his design of the new Bauhaus building at Dessau.

Gropius first visited the United States in 1928 and moved permanently to this country in 1937, having first gone to England in 1934 to flee the Nazi regime in his native country. Harvard University invited him to its faculty soon thereafter.

Gropius was made a Fellow of The American Institute of Architects in 1954 and received the Gold Medal of the Royal Institute of British Architects in 1956. He has been honored by architectural societies and universities all over the world.

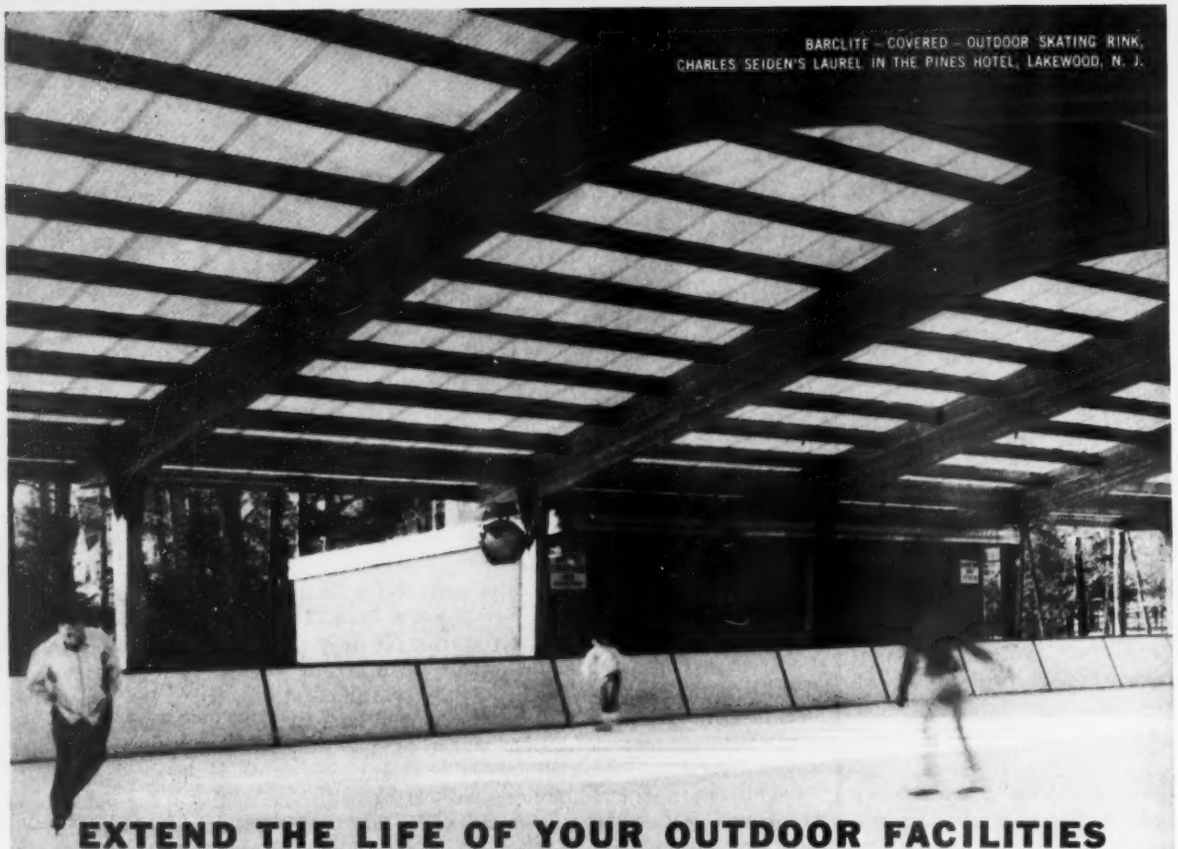
The AIA Gold Medal, the highest honor American architects can bestow, may be awarded annually in recognition of most distinguished service to the architectural profession. Previous gold medalists include John Wellborn Root in 1958, Louis Skidmore in 1957, Clarence S. Stein in 1956, William M. Dudok in 1955, and Frank Lloyd Wright in 1949.

Walter Gropius lives in Lincoln, Mass., in a residence he designed in 1937.

NATHAN W. DOUGHERTY, PE

Scholar, educator, engineer, Dean Nathan W. Dougherty was the eighth recipient of the NSPE Award in recognition of "his outstanding leadership in his profession as evidenced by his devotion to the advancement of engineering education, his sympathetic encouragement of students of engineering, his zealous promotion of

(Continued on next page)



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(Continued from page 45)

the ideals and principles of his profession and his humanitarian interest in his fellow men."

So reads the citation accompanying the award by the National Society of Professional Engineers to the distinguished dean emeritus of the University of Tennessee.

Dean Dougherty was a member of the University of Tennessee faculty for 40 years, the last 16 as Dean of Engineering. The impact of his presence in this vital position has made an inestimable contribution to the engineering profession.

Among his many professional accomplishments are numbered the presidency of the American Society for Engineering Education in 1954-55, chairmanship for 17 years of the Tennessee State Board of Architectural and Engineering Examiners, member of the Board of Direction and Vice President of the American Society of Civil Engineers from 1943 to 1946, chairman in 1934 of the National Council of State Boards of Engineering Examiners, and a vice president of NSPE for 1952-54.

In addition to his work as an educator, Dean Dougherty has taken a prominent role in developing leadership in young men through athletics. During his days as an engineering student at the University of Tennessee, he participated in football, basketball and track, becoming captain of all three teams. This keen interest in developing the mental and physical health of young men has continued through his participation as the president of the Southern Conference in 1929, secretary-treasurer of the Southeastern Conference, and as an officer of the National Collegiate Athletic Association.

Dean Dougherty has served as special assistant and consultant to the United States Government and to his own state of Tennessee on projects of national scope and importance. He has also been a frequent contributor to the technical journals of his field, and enjoys membership in five honorary fraternities including Tau Beta Pi.

(Continued From Page 5)

and journals, but texts in and on the fringes of our specialized interests.

The modern engineer should not be reluctant to undertake a new task even if this means some self-education. He should be eager to utilize those tools which other disciplines are making available. He should be able to converse fluently with innovators on the fringes of his chosen field. Computors, both analog and digital, should be finding their rightful place along side the engineer's slide rule.

Impetus from architects

The architectural profession can supply impetus to this forward movement by refusing to accept the attitude that a radically new design is unsound because "it's never been done before." Engineers have available today many of the materials and tools which would allow them to execute some of the fondest dreams in structure. Architectural requirements must be high, and the architect must be persistent in demanding higher and higher levels of structural performance.

And finally, the owner, the banker, the realtor, the city planner and the government official who in one way or another, have great influence over the shape of modern and future structures. These people can help greatly by planning their own requirements and schedules in such a fashion that they give architects and engineers time to create, time to explore, time to analyze, and time to come up with a product that gives the client his money's worth. In most design offices, we find the staffs frantically trying to produce, not designs, but drawings which are demanded by schedules which do not allow for creative design. Clients must therefore do planning and better scheduling; I am certain that the subsequent improvements in structures will more than justify this approach to building design.

Growth potential

New and exciting structures have been conceived in many countries in the last 20 years. America is responding partly because of our native talents and partly because we have been fortunate in acquiring from foreign shores such talents as Mies van der Rohe, Saarinen, Severud, Tedesko and others. Our nation is capable of a laudable contribution entirely on its own. But this contribution requires that the city planners and architects demand more from the engineer than they have in the past, and that our schools reshape their curricula to provide graduates who are capable of attaining advanced levels in structural analysis.

ARCHITECTURAL USES OF PLASTICS: PART TWO

digest:4

This month's digest presents the architectural applications of plastics classified according to various trades and means of materials utilization. Reference sources: ASTM Standards on Plastics, ASTM, Philadelphia, Pa.; Architectural Plastics Corp., Eugene, Ore.

ELECTRICAL

1. *Suitable types of plastics:*
   Wire insulation: *vinyl, polyethylene;* Wall plates, plugs, switches, outlet boxes: *most thermosetting plastics;* Fixtures, diffusers: *vinyl, polystyrene, acrylic.*
2. *Advantages:*
   Low cost, intricate shapes; dielectric superiority; high diffusion and transmission of light; decorative.
3. *Problems (limitations or disadvantages):*
   Impact resistance in comparison with steel; fire-resistance; temperature limitations.
4. *Other remarks:*
   Extensive use of plastics in electrical systems in architecture almost historical. Lighting systems and fixtures largely plastics.

EXTERIOR WALL SURFACING

1. *Suitable types of plastics:*
   Fibrous glass reinforced plastics; sprayed-on sheeting; vinyl-clad steel.
2. *Advantages:*
   Built-in color; mechanical or adhesive fastening; opaque or translucent; weather resistant; sheet metal principles in use.
3. *Problems (limitations or disadvantages):*
   Weathering; rain and wind erosion.
4. *Other remarks:*
   Necessary permanence in outdoor wall and roof materials not yet accomplished. Ten-year maintenance materials available.

FLOOR COVERING

1. *Suitable types of plastics:*
   Vinyl, vinyl asbestos; neoprene.
2. *Advantages:*
   Specific performance; permanent finish and color; variety in design; low cost and flexibility.
3. *Problems (limitations or disadvantages):*
   Shrinkage; heat limitations; careful use of adhesives.
4. *Other remarks:*
   Floor coverings of plastic materials well established. Higher quality at lower prices gradually accomplished.

HARDWARE

1. *Suitable types of plastics:*
   Hinges, catches, rollers, track, etc.: *most thermosetting plastics;* Drawers: *phenolics;* Screen, folding doors: *vinyl.*
2. *Advantages:*
   Low cost; intricate shapes; pre-finishes; mechanical advantages; sanitary; non-corrosive.
3. *Problems (limitations or disadvantages):*
   Need for additional engineering and design data for long-range performance and maintenance predictability.
4. *Other remarks:*
   Wide variety of injection molded hardware articles available. Insect screening well established. Vinyl folding doors available from many sources. Plastics can be used to advantage in whole or part in most hardware.

HORIZONTAL SURFACING

1. *Suitable types of plastics:*
   Melamine and phenolic laminates; calendered vinyl; reinforced plastics; vinyl laminates; vinyl-clad metal.
2. *Advantages:*
   Chemical resistance; abrasion resistance; design freedom; cost variety.
3. *Problems (limitations or disadvantages):*
   Heat limitations and systems of joints.
4. *Other remarks:*
   High pressure phenolic-melamine laminates most adequate performer yet developed and marketed generally. Lower cost vinyls offer less heat resistance. Many other sheet materials available for specific applications.

INSULATION AND CUSHIONING

1. *Suitable types of plastics:*
   Expanded cellulose acetate, polystyrene, epoxy, phenolic vinyl, foamed glass and isocyanate plastics.
2. *Advantages:*
   Low thermal conductivity; structural strength; water resistance; light weight; chemical resistance; clean; non-irritating in handling.
3. *Problems (limitations or disadvantages):*
   Polystyrene: temperature limitation to 180° F; affected by many organic solvents; Epoxy: relative high cost.
4. *Other remarks:*
   Expanded polystyrene extensively used for low temperature insulation—needs no vapor barrier. Elastomeric vinyl foams are grease resistant cushioning materials for walls and floors. New epoxy foams are solvent resistant.

INTERIOR WALL SURFACING, DECORATIVE

1. *Suitable types of plastics:*
   Calendered vinyl; vinyl laminates; vinyl-coated fabrics; vinyl-clad metal; styrene tile; sprayed-on sheeting; high pressure laminates.
2. *Advantages:*
   Excellent permanent and maintenance-ease finishes; variety of application systems.
3. *Problems (limitations or disadvantages):*
   Staining of plasticized vinyls: termination points; joint systems; adhesives.
4. *Other remarks:*
   Increased use of permanent wall finishes in all building areas. Remarkable variety of materials and designs available.

INTERIOR WALL SURFACING: INDUSTRIAL

1. *Suitable types of plastics:*
   Calendered vinyl; sprayed-on sheeting; plastic coatings, vinyl-clad metal, fibrous glass reinforced polyesters and epoxies; flame-sprayed polyethylene; rigid vinyl.
2. *Advantages:*
   Specific chemical resistance; specific physical performance; total construction uses, coatings or envelopes.
3. *Problems (limitations or disadvantages):*

digest: 4

Cost and structural problems in large units; heat limitations; terminations in sheeting.

4. *Other remarks:*
Corrosion-proof constructions finding increased use of polyvinyl chloride and fibrous glass reinforced plastics. Corrosion coatings and membranes available in a wide variety of specifically engineered materials.

LUMINOUS CEILINGS, DAYLIGHT USES

1. *Suitable types of plastics:*
Fibrous glass reinforced polyesters or acrylics; cellulose acetate butyrate, acrylics.
2. *Advantages:*
Optimum lighting qualities; controlled transmission and diffusion of light; good weathering and ultra-violet resistance.
3. *Problems (limitations or disadvantages):*
Slow-burning material unless fire-retardent resins used.
4. *Other remarks:*
Low cost efficient lighting for schools and commercial applications have utilized single or double systems. Effective in "day-use" buildings such as schools. Low brightness ration and high intensity.

LUMINOUS CEILINGS: ARTIFICIAL

1. *Suitable types of plastics:*
Fibrous glass reinforced polyesters or acrylics; cellulose acetate butyrate, acrylics; vinyl film and sheeting; polystyrene sheeting; honeycomb and grids.
2. *Advantages:*
Low cost; self-extinguishing; high light transmission and diffusion; simple suspension and acoustical control systems available.
3. *Problems (limitations or disadvantages):*
Cleaning; static; ultra-violet degradation.
4. *Other remarks:*
A wide variety of materials and suspensions systems available. Many quantities and patterns.

PIPING

1. *Suitable types of plastics:*
Polyethylene; vinyl; vinylidene chloride copolymer film; butyrate; modified syrene; fluorocarbons.
2. *Advantages:*
Corrosion resistance; simplicity of fabrication; wide variety of properties; controlled rigidity.
3. *Problems (limitations or disadvantages):*
Temperature limitations in thermoplastics; aging, fatigue.
4. *Other remarks:*
Simplified joint systems. Field sprinkling systems largest current use other than industrial applications.

PLUMBING FIXTURES

1. *Suitable types of plastics:*
Fibrous glass reinforced plastics: tubs, washbowls, shower stalls, etc.; *modified styrene; vinyl; reinforced epoxies* used for laboratory sinks.
2. *Advantages:*
Light weight; colorful; translucent; low cost; highly decorative uses possible.
3. *Problems (limitations or disadvantages):*
Abrasion resistance of some fibrous glass reinforced plastics; question of competitiveness with porcelain steel.
4. *Other remarks:*
Basic fixtures not extensively used. Accessories well established. Much field research to be accomplished. Possibilities of surface and sheet laminations. Drawn uses of vacuum formed thermoplastic fixtures under test.

SANDWICH PANELS

1. *Suitable types of plastics:*
Cores: metal, paper and duck honeycombs; *expanded plastics.* Skins: *fibrous glass reinforced plastics;* metal, wood and *phenolic laminates.*
2. *Advantages:*
Anticipated low cost; simplicity; variety of surfaces; insulation; sound absorption; colorful; translucent; light weight.
3. *Problems (limitations or disadvantages):*
Relative high cost; fabrication details; permanent weathering surface. However, improvements rapidly advancing uses.
4. *Other remarks:*
Large variety of composite wall units anticipated.

STRUCTURAL GLAZING

1. *Suitable types of plastics:*
Fibrous glass reinforced: polyesters, epoxies, acrylics, etc.
2. *Advantages:*
No breakage; control of color; light transmission; strength; variety of forms; can be mechanically installed as part of basic structure.
3. *Problems (limitations or disadvantages):*
Depending on source, lack of clarity optically; rain erosion and uniformity controls to be observed.
4. *Other remarks:*
Low cost when applied without sash directly to structural system. Structural glazing used in large volumes in industrial, commercial and school construction. Roof lighting highly satisfactory when properly engineered. Anticipated price stabilization.

STRUCTURAL MEMBERS

1. *Suitable types of plastics:*
Fibrous glass reinforced plastics; rigid polyvinyl chloride.
2. *Advantages:*
Opportunities for pre-stressed fibers; corrosion resistance.
3. *Problems (limitations or disadvantages):*
Cost comparison to metal; development of further engineering data necessary for practical application.
4. *Other remarks:*
Developments expected to accelerate with development of sandwich panels.

VAPOR BARRIERS AND MEMBRANES

1. *Suitable types of plastics:*
Polyethylene film; vinyl film; polyester film; sprayed-on sheeting.
2. *Advantages:*
Low cost; specific performance; large sections; seamless; flexible members.
3. *Problems (limitations or disadvantages):*
Limited sunlight tolerance.
4. *Other remarks:*
Film increasingly important in present building practices. Large widths for more effective application. Inert and very low cost. Sprayed-on sheeting provides interior finish as well.

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calendar

April 19-23 AMERICAN SOC OF MECHANICAL ENGRS: oil and gas power conference and exhibit, Shamrock Hilton, Houston, Tex.

23-24 ILLUMINATING ENGR SOC: south central and southeastern regional meeting, Asheville, N. C.

28-3 CONSULTING ENGRS COUNCIL: annual general meeting, Biltmore Hotel, New York City.

29-3 AMERICAN SOC OF MECHANICAL ENGRS: metals engineering conference, Sheraton-TenEyck, Albany, N. Y.

May 4-5 ILLUMINATING ENGR. SOC: southwestern meeting, Shamrock-Hilton Hotel, Houston, Tex.

4-5 CONSTRUCTION SPECS INST: national convention, Palmer House, Chicago.

4-8 AMERICAN SOC OF CIVIL ENGRS: national convention, Sheraton-Cleveland Hotel, Cleveland, Ohio.

7 ARMOUR RESEARCH FOUNDATION: corrosion inhibition symposium, Illinois Institute of Technology, Chicago.

11-12 ILLUMINATING ENGR SOC: inter-mountain regional meeting, Continental Hotel, Denver, Colo.

14 LIGHTING AS A TOOL OF ARCHITECTURE: talk by Richard Kelly, Architectural League, New York City.

18-21 BUILDING OFFICIALS CONF OF AMERICA, INC: convention, St. Paul, Minn.

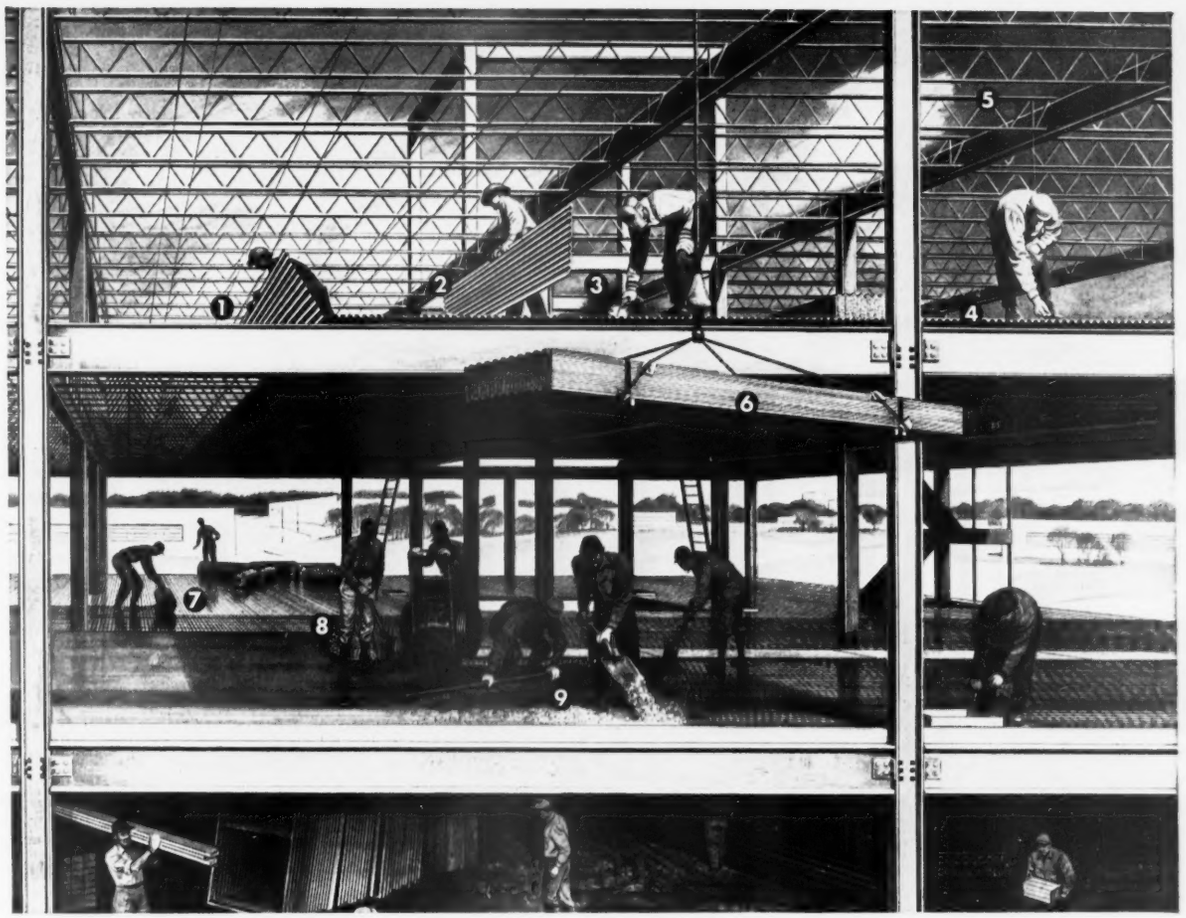
20-21 BUILDING RESEARCH INST: conference on building illumination, Statler-Hilton Hotel, Cleveland, Ohio.

25-28 DESIGN ENGR SHOW: and fourth design engineering conference, Convention Hall, Philadelphia, Pa.

June 4-5 ILLUMINATING ENGR SOC: northeastern regional meeting, Curtis Hotel, Lenox, Mass.

7-11 AMERICAN SOC OF HEATING AND AC ENGRS: semi-annual meeting, Vancouver, B. C.

21-26 AMERICAN SOC FOR TESTING MATERIALS: annual meeting Chalfonte-Haddon Hall, Atlantic City, N. J.



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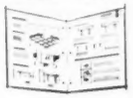

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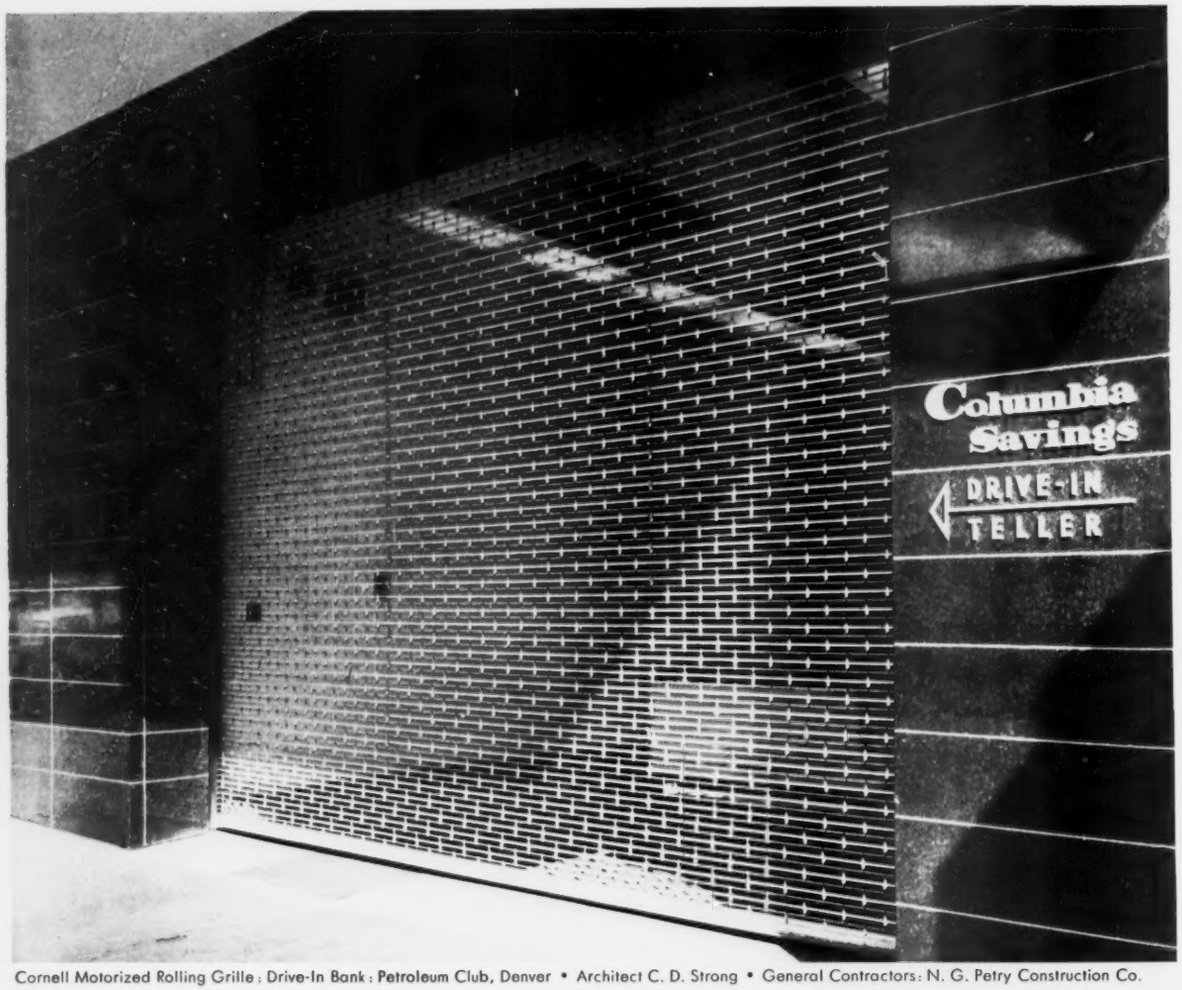

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